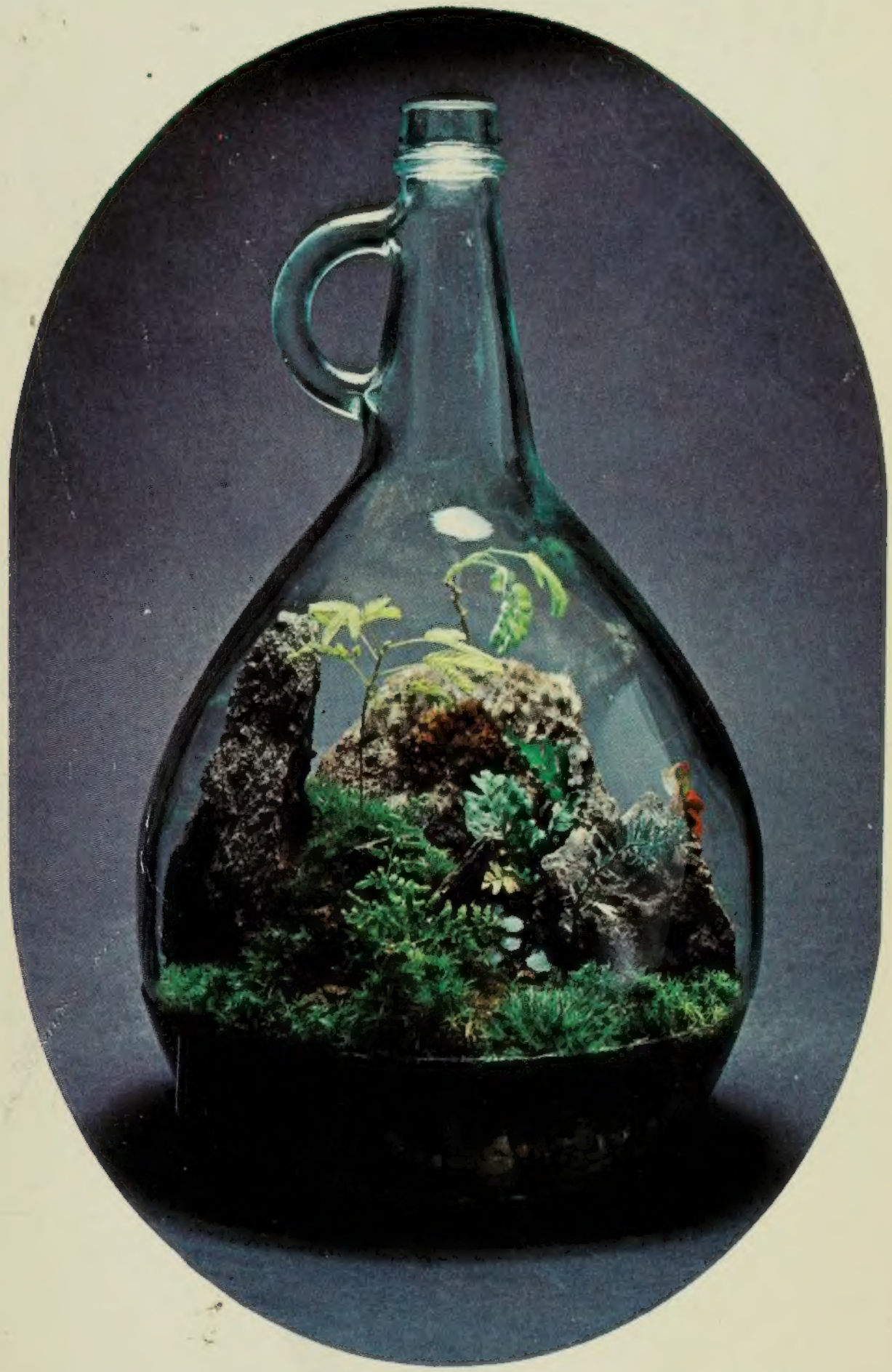
LANCER LARCHMONT BOOKS

76340-195 $1.95

By the leading authority in the field

JACK KRAMER

BOTTLE GARDENS



The new, easy, fun
way of indoor gardening—
A complete how-to guide
for planning and planting
your terrarium.

Covers 350 plants—Hundreds of photos and illustrations.

Digitized by the Internet Archive
in 2010

http://www.archive.org/details/bottlegardens00kram

IF POTTED PLANTS ON WINDOWSILLS HAVEN'T RESPONDED TO YOU—HERE'S AN EASY, INEXPENSIVE WAY OF GARDENING WITHOUT HEADACHES . . .

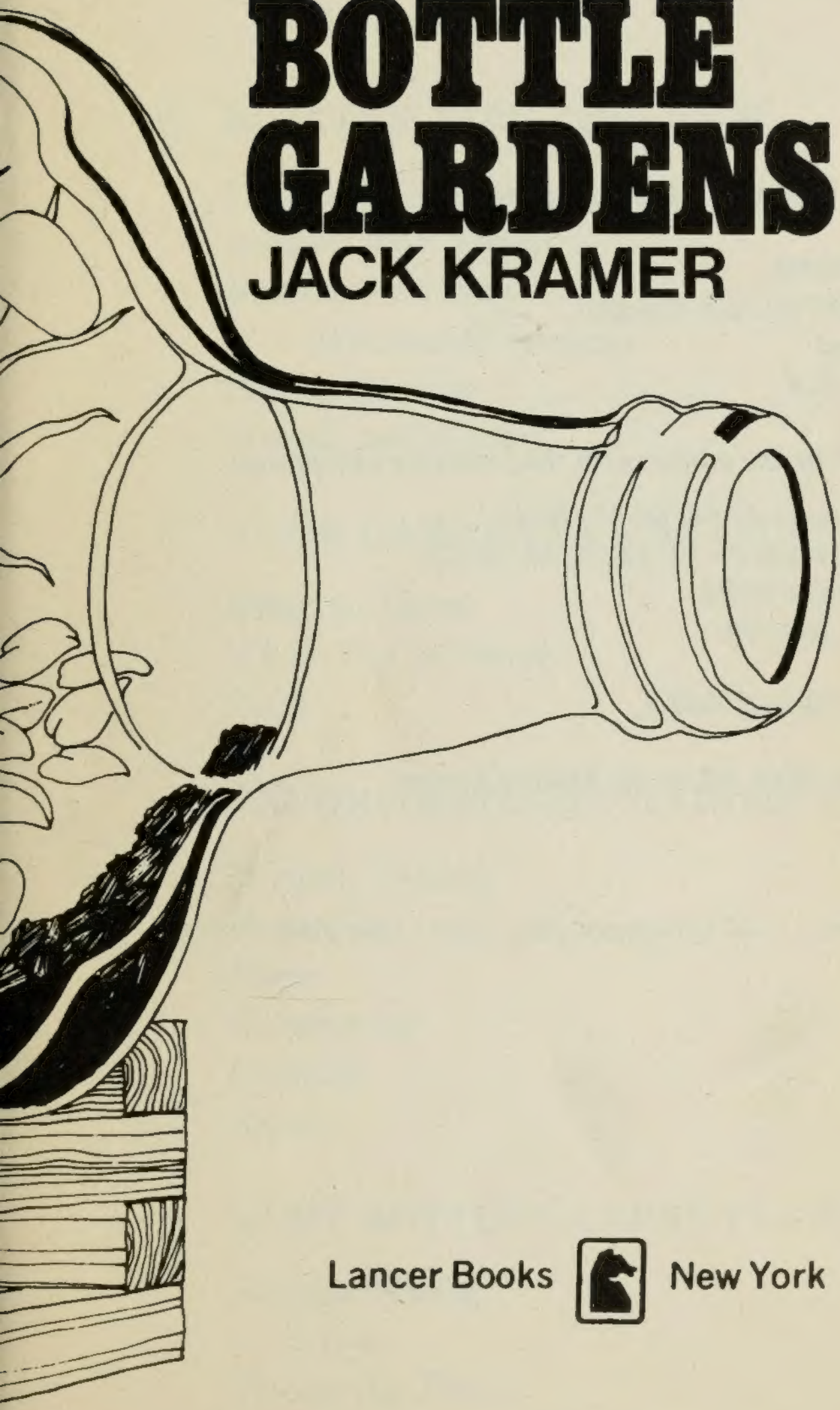
Planning your garden and choosing the right plants is what this book is all about. Whether your landscape will be tropical and lush, shady and woodsy, a formal scene reminiscent of majestic gardens or simply a single plant, you will be the gardener and creator—and each garden will challenge your skill.

Jack Kramer's BOTTLE GARDENS will teach you how to create unique gardens under glass—without the hassles or headaches of growing plants indoors.

HOW TO PLAN YOUR TERRARIUM

BOTTLE GARDENS

JACK KRAMER



Lancer Books New York

Lancer Books New York

BOTTLE GARDENS

Copyright © 1973 by Jack Kramer
All rights reserved
Printed in the U.S.A.

All photos taken by the author with the following exceptions:

Merry Gardens, pages 41-44; 60-70, 78-81.
Joyce R. Wilson, pages 46-49; 52-54; 59; 71-72.
Matthew Barr, pages 90-93.
Wayside Garden, page 56.

All drawings by Michael Valdez

All arrangements, chap. 10 are by Richard Lucier

Lancer Books, Inc., 1560 Broadway, New York, New York 10036

CONTENTS

1 BOTTLE GARDENS 13

Gardens without Headaches
How They Work
Where to Put Bottle Gardens
Floating Gardens

2 BOTTLES, JARS, AND JUGS 21

Shapes, Sizes, and Colors
Bottles You Find
Bottles You Buy
Wholesale Sources
Plastic Bottles
Stands and Corks

3 YOUR GARDEN IN A BOTTLE 31

What to Grow
What Not to Grow
Tool

4 FAVORITE BOTTLE GARDEN PLANTS 38

African Violets
Begonias
Ferns
Geraniums
Orchids
Roses

5 MORE BOTTLE GARDEN PLANTS 59

Foliage Plants
Ivy
Flowering Plants
Ground Covers (Mosses)

6 PLANNING AND PLANTING 84

The Landscape
Design
Design Tips for Square or Rectangular Bottles
Design Tips for Round Bottles
Mechanics of Bottle Garden Planting
To Undo the Bottle Garden

7 CARE OF BOTTLE GARDENS 95

Watering
Grooming and Replanting
Plant Protection
Plant Clues and Cures

8 BOTTLE LANDSCAPES 104

Woodland Gardens
Marshland Gardens
Tropical Gardens
Japanese Landscapes
Desert Garden

9 CUTTING BOTTLES—USES FOR CUT BOTTLES 124

Commercial Bottle Cutters
Tap Cutter
Hot-Wire Cutter
Old-Fashioned Method
Dome Gardens

10 BOTTLE BOUQUETS 131

Suitable Plants
Drying
Tools and Materials
Garden Flowers for Drying
Wild Plants
Making the Arrangement

11 SPECIAL BOTTLE GARDENS 141

Water Bottle Care
Blossom Gardens

12 WHERE TO GET PLANTS 146

Mail-Order Suppliers
Florist Shops and Nurseries
Grow Your Own
Where To Buy Plants
Where To Buy Glass Bottles
Books To Read
Pamphlets and Periodicals

Authors Note:

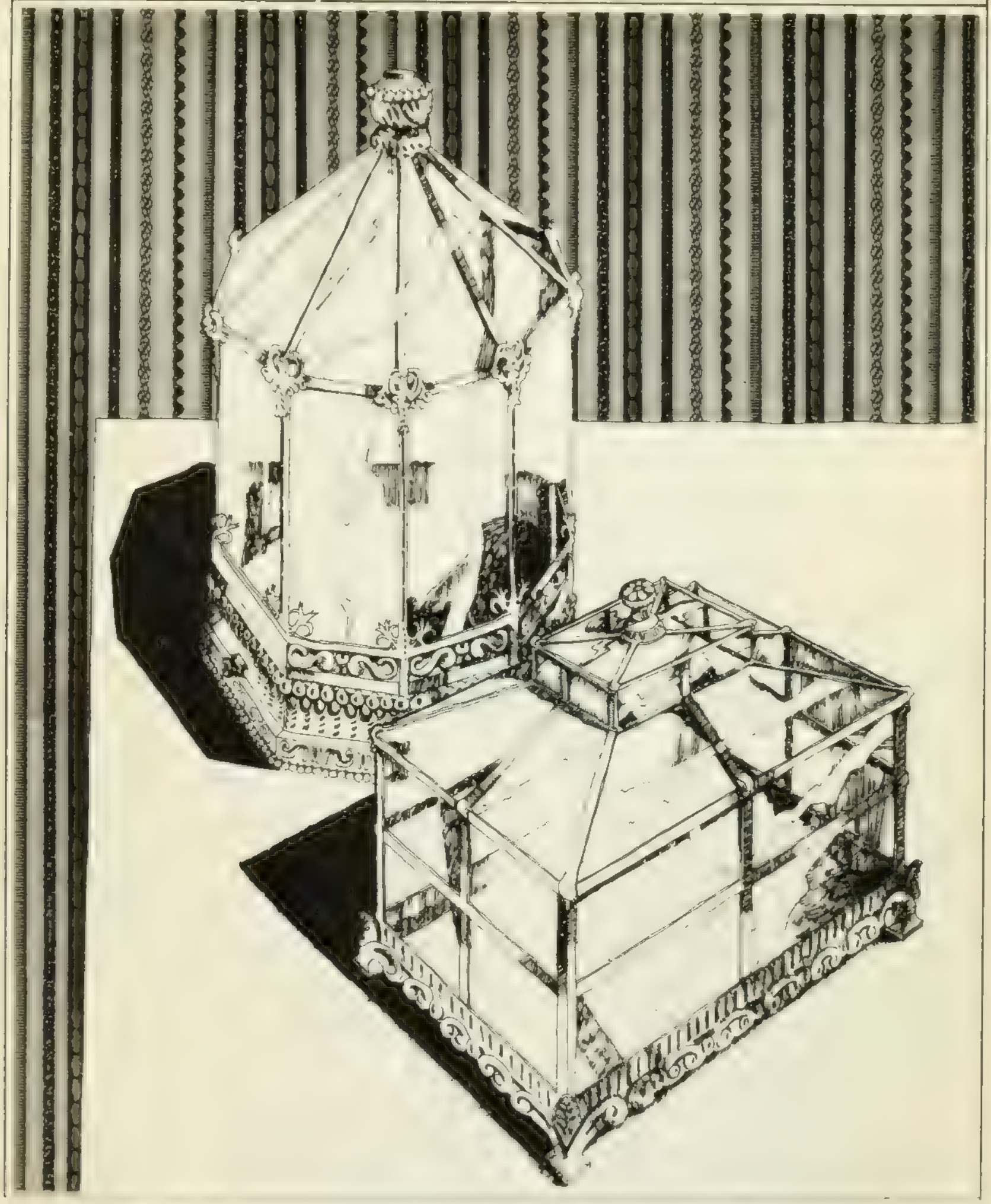
In this book, Latin names of plants are used and appear in italics, followed by common name, where applicable. When ordering or asking for plants, refer to them by their Latin name to be sure you get the plant you want. Common names are often different in various parts of the country.

BOTTLE GARDENS

1 BOTTLE GARDENS

The idea of growing plants under glass is not new. Nathaniel Ward, a London physician, created an all-glass case (now called the Wardian case) about 1840 (see Drawing 1). Originally he intended to study moths enclosed in the case, but he noticed that plants were starting to grow in the case, the same plants he had tried to grow without success in his garden. The plants in the closed case (the equivalent of a bottle) lived untended for years.

Thus, the bottle garden is a miniature greenhouse because within it, plants have almost ideal conditions. There is sufficient humidity (lack of the right amount of humidity causes the death of most house plants) and no harmful drafts, fluctuating temperatures, or pollution. So if pot plants at windows haven't responded for you, here is an easy way to garden without headaches. Although many houseplants require sunny windows, most bottle gardens need only bright light, and you can put them anywhere in the house: the kitchen, bathroom, living room—anywhere you want green accent.



Drawing 1

GARDENS WITHOUT HEADACHES

The question I am most frequently asked is, "When should I water my indoor plants?" This is difficult to answer because watering depends on many variables, including the size of the pot, the kind of plant being grown, and what kind

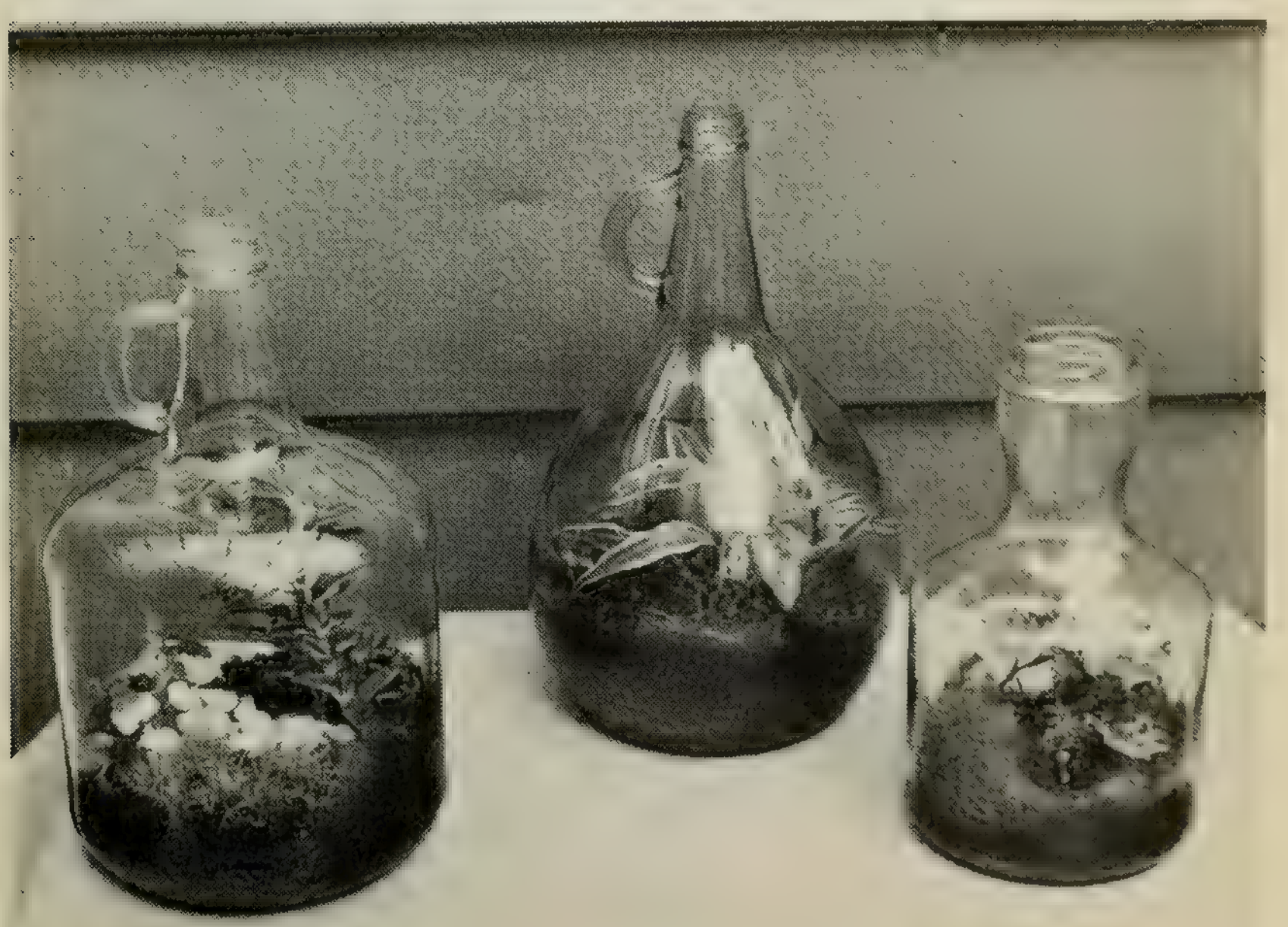
of pot the plant is in. However, you don't have to worry about water or humidity in a bottle garden, as we shall discuss in the next section.

With bottle gardens you don't have to worry about drafts, which are especially harmful to many plants; for example, some *peperomias* and *philodendrons* can drop their leaves overnight if left in drafts. But behind glass, plants are protected and temperatures do not fluctuate radically, another gardener's headache with pot plants.

Glass allows filtered light to enter all parts of the garden, which is ideal, since strong sun is not needed for bottle gardens; indeed it can cook plants. Furthermore, protected by their glass house, plants are rarely bothered by insects which is certainly an advantage. Finally, because bottle garden plants need no feeding, dangerous salts, which turn leaf edges brown and make a plant unsightly, don't accumulate in the soil.

The most popular plants used for bottle gardens are inexpensive miniatures, although seedlings of houseplants are suitable too. Containers are also inexpensive, and by using

These bottle gardens are from household containers; a vinegar bottle (left), a wine jug (center), and an apple cider bottle.



This hand blown glass container is perfect for small gardens; it has ample width and height for planting. Plants are *fittonia, cordyline* and *draecaena.*

This apothecary bottle contains a tropical garden and decorates a living room table.

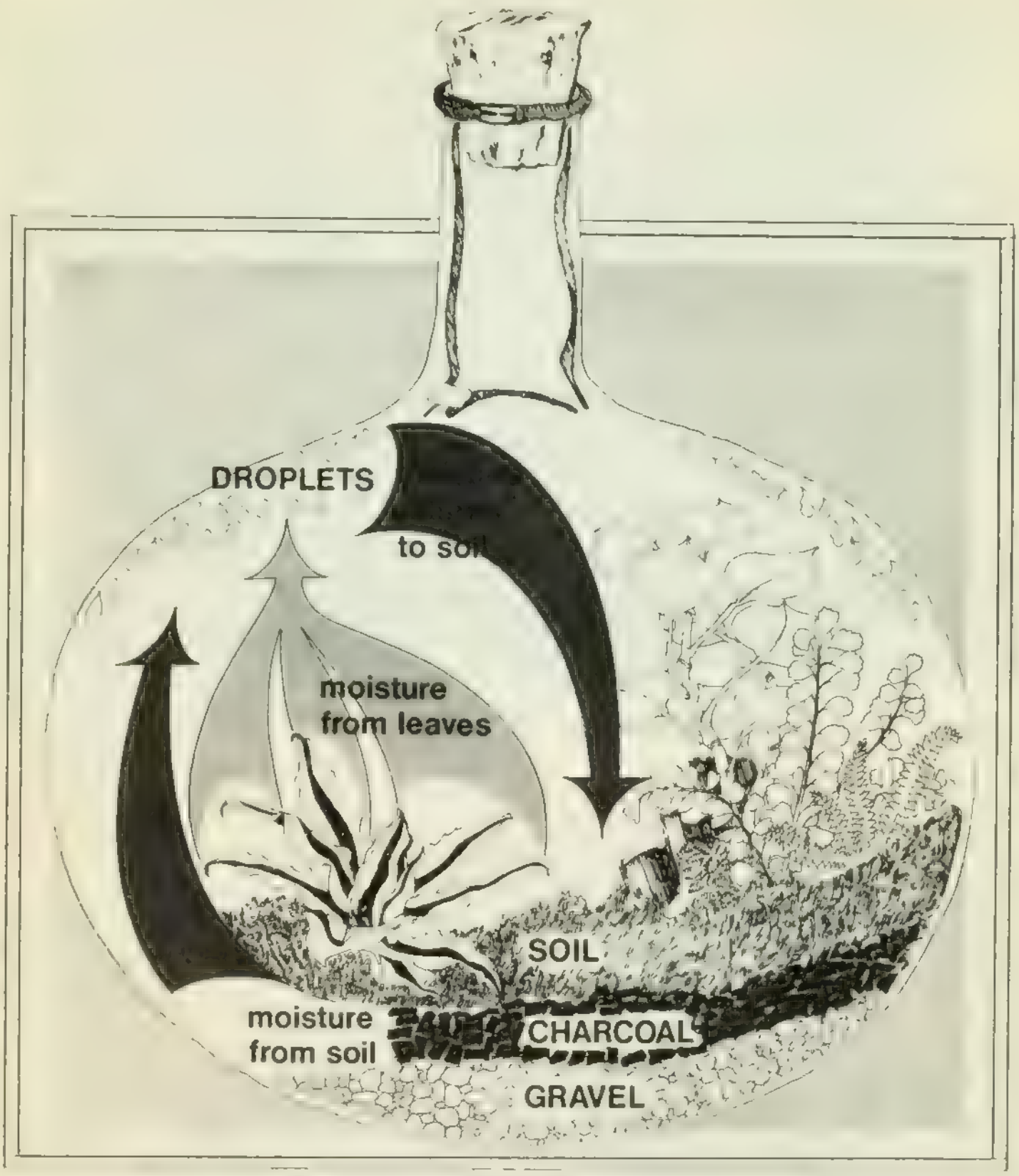
Ferns are the dominant plants in this close up view of a bottle garden.

cider jugs and vinegar bottles that would be discarded anyway, you help in the recycling fight and create beauty.

How They Work

The principle of the bottle garden is simple: moisture evaporates from the soil and from plant leaves. It condenses on the glass (you will see it) and then naturally runs down the sides of the glass into the soil, providing moisture for the plants (see Drawing 2). You rarely have to lift a finger to perform this perfect cycle of life, although occasionally, if the terrariums get too wet inside, the stopper or corks should be removed for a few hours. (Actually, it's a good idea to remove stoppers during the day anyway.)

Because the container is closed most of the time, inside humidity ranges from 70 to 90 percent, which is ideal for most plants, and, of course, there is little dust or dirt in the bottle garden. Thus, plants live longer and grow better since they breathe through their leaves.



Drawing 2

Where to Put Bottle Gardens

Your bottle garden can be an elegant crystal decanter with ferns or tiny orchids, a display piece for a coffee table or hall desk. It can also be a cider jug or pickle jar with house plants, ideal for a windowsill. Or it may be a large water jug filled with tropical plants and used as a floor piece. In any

case, the garden in a bottle can be placed anywhere in the home where there is some light. But do avoid direct sun—otherwise the "miniature greenhouse' becomes too hot and humid and plants suffer.

Reception rooms of offices and executive desks are other good places for the glass garden.

Don't lift large planted bottles by the neck. Filled with soil and plants they are heavy, and weight bearing down on the bottom of the glass may cause breakage.

A ginger jar houses a dwarf azalea; this container has ample planting space and is excellent for miniature landscapes.

A ships decanter has little planting space but still provides a decorative note; plants are low growing ground covers.

Floating Gardens

The bottle garden suspended from the ceiling in fishnet or rattan is very handsome. These floating gardens are at eye level, are easily seen, and make superb decorations.

Not all bottles will adapt to the hanging device, but round and oval ones will. Various supply stores have fishnetting and other fabrics that can hold the container. Be sure, however, that the hanging device is *securely anchored* to the ceiling; remember, bottles filled with soil and plants can be very heavy.

2 BOTTLES, JARS, AND JUGS

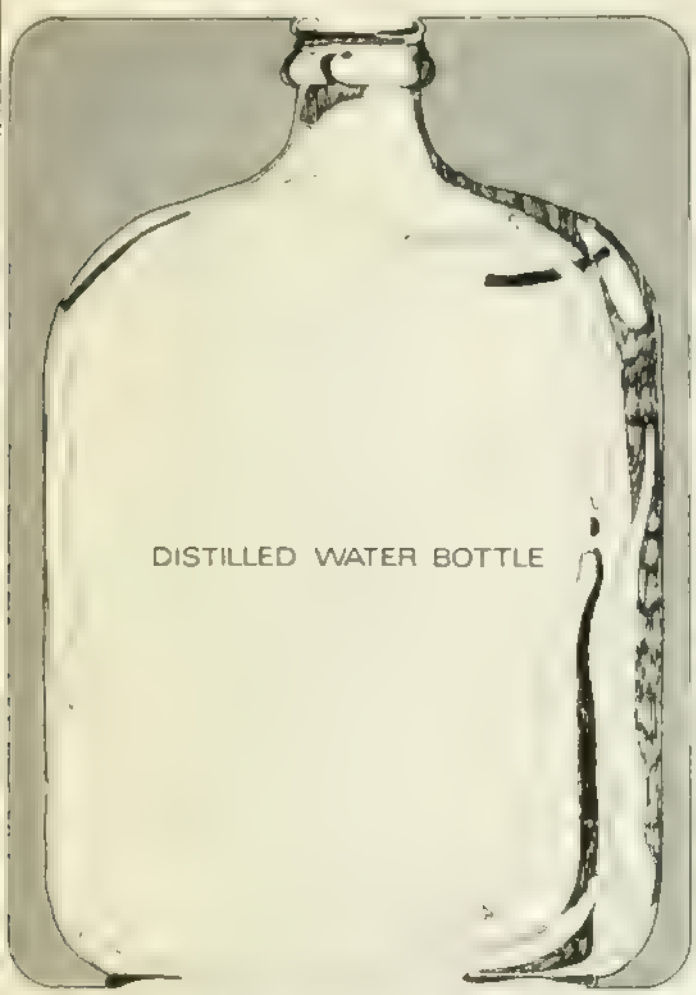
The containers for your miniature gardens are just as important as the plants. There is an array of bottles for greeneries. Some you may find in salvage shops; some you can buy at supermarkets, gift shops, and boutiques; and some may be gifts from friends when they know you are doing miniature plantings. The bottle may be a milk bottle, wine jug, chemists' flask, cider or vinegar jug, an old medicine or apothecary bottle or a pickle jar (see Drawing 3). Keep in mind the following points no matter what bottle you use:

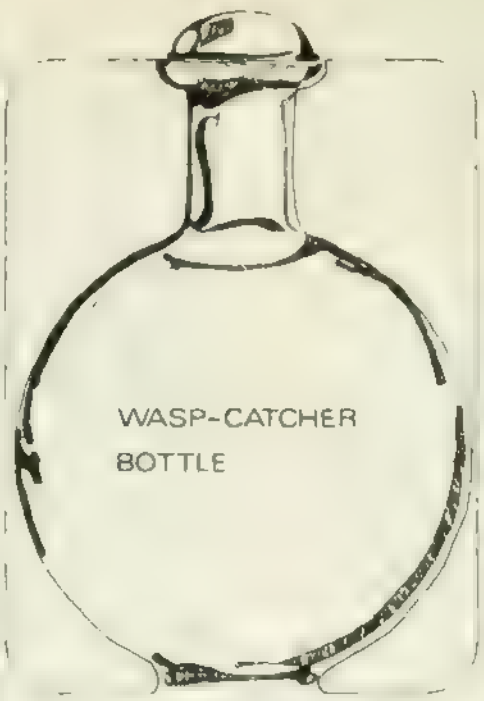
- The shape of the bottle must be attractive.
- There must be sufficient space for plants.
- The neck of the bottle should be at least 1 inch in diameter (very narrow-necked bottles are impossible to plant).
- The glass should be transparent.

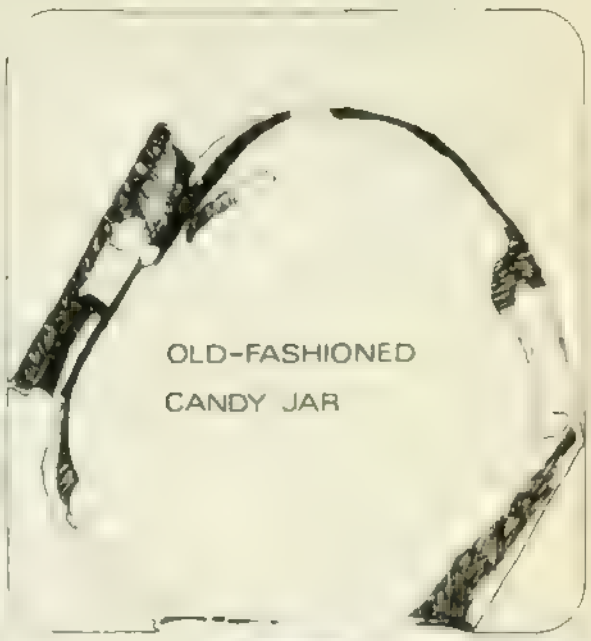
SHAPES, SIZES, AND COLORS

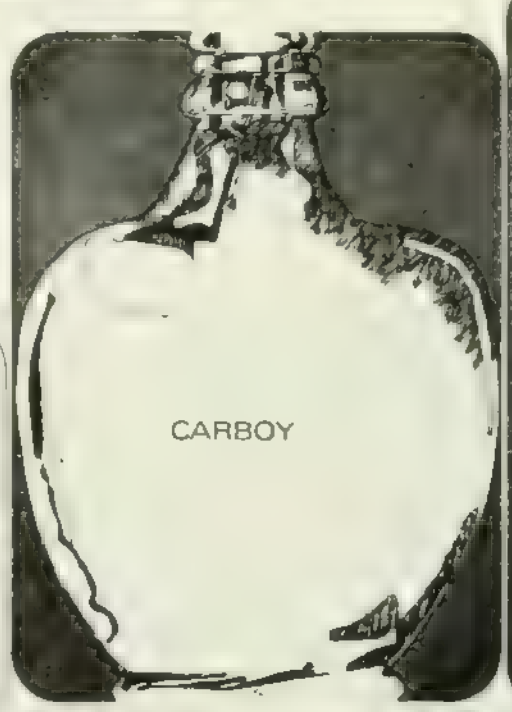
Because some bottles are lovely in themselves, bottle collecting is a popular hobby, but generally collector's bottles

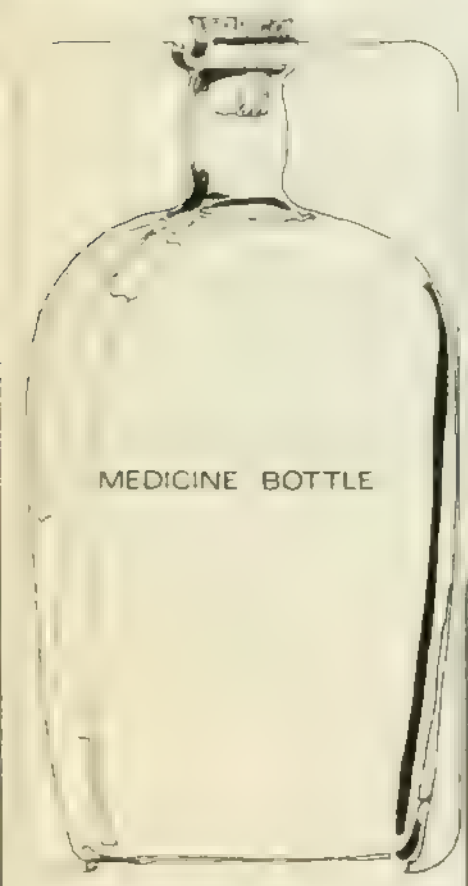
GLASS CONTAINERS

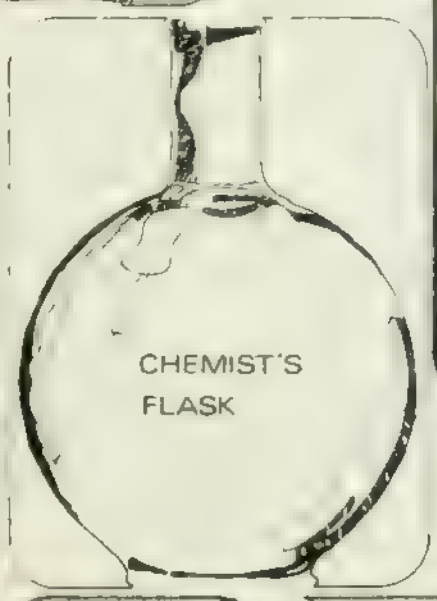


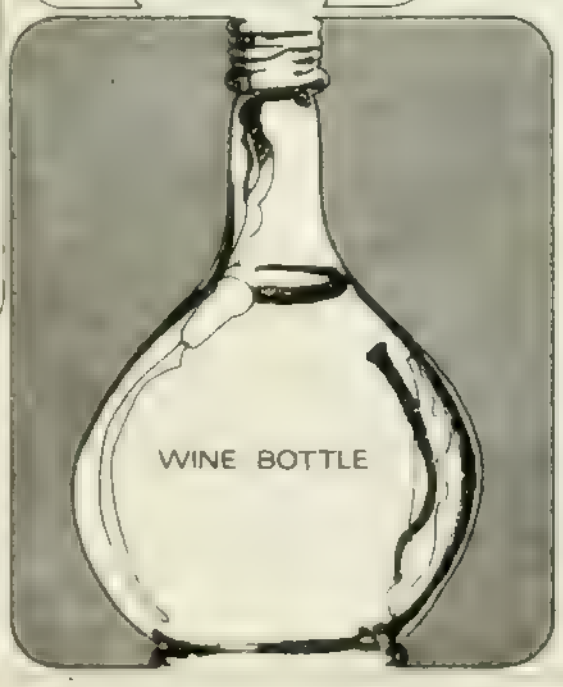


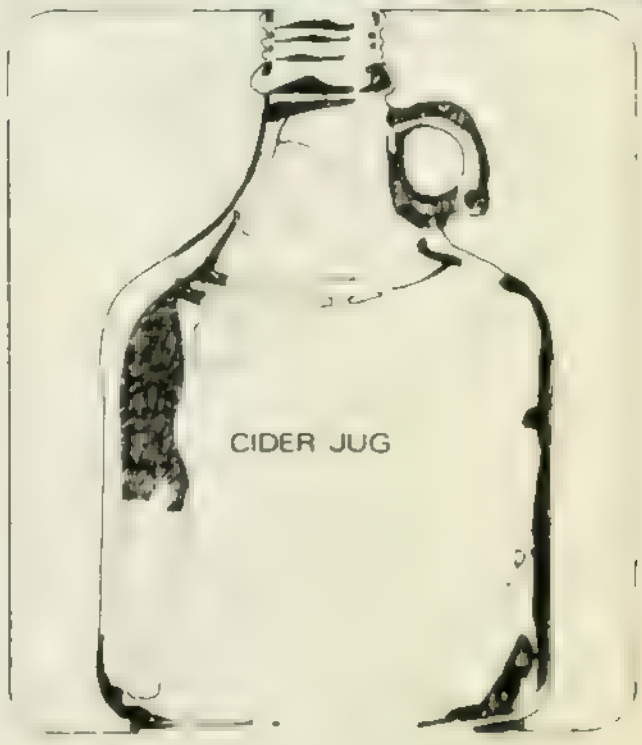












Drawing 3

are not large enough for lilliputian greeneries. Garden containers are available in a variety of shapes, but the round or globular shapes are best for planting because they are attractive and have sufficient growing space. Tall and rectangular or square bottles are handsome too, but they must be planted intelligently: use only a few tall plants. Ideally the bottle for a miniature garden should be at least 8 to 10 inches in diameter and 10 to 12 inches high, although smaller containers can be used.

In addition to a bottle's shape and size, consider its color. Even clear glass comes in different tints because glass contains some iron. Clear glass ranges in color from crystal clear to green to blue-green to blue. Also, remember that bottles made of heavy glass are difficult to see through. It is disheartening to plant a lovely small garden in glass and then find you cannot see it because of distortion!

Colored-glass bottles—deep blue, amber, ruby red, or vivid green—are sometimes found, but these simply are not suitable for our purposes. *Avoid them.* However, bottles with a slight green or blue cast are fine because the colored glass shields plants (to a degree) from the sun.

BOTTLES YOU FIND

You may find some large bottles in junk shopes, for example, old fashioned 2- or 5-gallon milk containers and pickle jars. Large pharmaceutical bottles are also excellent containers, as are old fruit-preserve jars. Smaller containers like liquor and perfume bottles are best left for collectors.

If old bottles are badly scratched, they will be impossible to see through, so hold them up to a light and examine them carefully. Clean old bottles throughly for appearance and for the health of the plants you intend to put in them. Some bottles (carboys, for example) may have contained chemicals, and even after years, fumes may linger to harm plants. However, carboys do have a delightful globe shape and make wonderful gardens. Don't use cleansers to clean glass because they will scratch, and avoid cleaning preparations that contain Clorox unless you are willing to wait a few days before making the garden: fumes can harm plants.

Water bottles are favorite glass garden containers; here house plants are used to create the scene: *aralia, fittonia.*

Instead use carborundum powder (available at hardware stores). Dip a damp cloth in the powder, smear the glass and wait a few minutes until the paste dries. Then wipe the glass with a lintless cloth.

BOTTLES YOU BUY

This group, which includes fine crystal decanters and brandy flasks, wine flagons, and vases, can be bought at gift

A chemists flask is still another receptacle for a small garden. Because the container has a rounded bottom it must be set in pebbles or in sand.

A hand blown 5-gallon glass bottle makes an elegant container for plants such as *pothos, maranta,* and *fittonia.*

shops and boutiques. They are elegant but generally expensive; however, they do make handsome gardens because the quality of the glass is superior to that of most containers and the shapes are very pleasing since they are intended for decorative purposes. Once again, be sure you select a container with an opening of at least 1 inch or it will be impossible to get plants into the bottle.

Handsome, hand-blown glass bottles are now appearing in various shapes: apple or pear shaped, elongated, spherical, and so forth. They are made of recycled glass, and thus color varies, but they are certainly fine for greeneries. Presently the supply is limited, but I'm sure there will be more available in the near future.

Supermarket bottles, of which there are an incredible assortment, are my favorites. I have had beautiful gardens in large apple juice and vinegar bottles. Pickle jars too are highly desirable for gardens. They are usually not as thick as other bottles, so they offer perfect visibility. Some restaurants will give them to you if you ask. Restaurants will also give you discarded wine bottles, but these are made of thick glass and some are colored and difficult to see through.

Some distilled water bottles are now being made of plastic. Only the 15- or 20-gallon size is available in clear or blue- or green-tinted glass. (Many nurseries now stock the clear, large-sized water bottle.)

Wholesale Sources

Write to the commercial wholesale suppliers of bottles to find retail dealers in your area. (Names are included in the back of this book.) Because you can get almost any shape and size bottle you want from their catalogs, do investigate these companies.

Other sources of unusual glass bottles are chemists' supply houses (listed in the Yellow Pages under Scientific Glassware). These flasks and beakers of various sizes make stunning containers for gardens, but whether wholesalers will sell them to you is a matter of individual policy. Some will, but others won't, so call and ask first. Most of these containers are stamped with various measuring marks that

True miniature plants live in this handsome wine flask.

can't be removed. However, they don't mar the beauty of the bottle.

Plastic Bottles

Occasionally, you may find transparent plastic bottles. These containers, however, are difficult to see through.

This bottle was found in a salvage shop and at one time perhaps contained chemicals. Here it is a small greenhouse for *selaginella* and a red leaved *peperomia.*

Furthermore, moisture that condenses on the inside of the bottle remains there because of the nature of plastic, i.e., it does not run down the sides into the soil, thus the principle of the bottle garden is thwarted and hand watering becomes necessary. Also, most plastics under moisture and heavy humidity develop algae on the inside of the container. This green scum is hardly pleasing and virtually impossible to remove because of the narrow bottle opening. *Avoid plastic;* use glass bottles for gardens and be sure.

Stands and Corks

We usually think of bottles in upright positions, but many bottles (depending upon their shape) suit themselves to horizontal placement. (Remember the ship in a bottle?) Generally, you'll need a round, oval and tall bottle with a cork if you want to have a horizontal garden because these adapt best to this placement. You can fill a shallow dish with colored sand and then place the bottle on the bed of sand, but a more appealing method is to build a small wooden prop stand for the garden. The garden is thus elevated and appears more aesthetically pleasing (see Drawing 9).

The horizontal bottle garden makes good sense because it provides more planting area; thus, some lovely landscapes can be created. Since tools for this garden differ somewhat from those mentioned in the next chapter, we shall illustrate them here. There is no commercial hardware available, so you'll have to fashion your own planting implements from heavy gauge or coat-hanger wire.

If the bottle you find doesn't have a cork, don't despair. Hardware stores now carry a wide variety of cork stoppers, so it is simply a matter of finding the right cork to match the diameter of the bottle neck. Glass toppers for decorative containers are more difficult to find; you must hunt in salvage stores until you find the suitable stopper.

3 YOUR GARDEN IN A BOTTLE

The bottle garden you create can be many things for many different places in the home. It may be a very large water-bottle garden in the living room or simply a small garden in a gallon wine bottle on your bedroom windowsill. Wherever you locate your bottle garden, even in winter you can have a personal display. The arrangement of the plants in the container, and the plants themselves are also important considerations. You can simulate natural scenes—woodland, the tropics—or even a rain forest. These diminutive scenes are delights, but be cautious; every specific landscape requires specific plants.* Ferns and trailing arbutus are compatible in the damp and shady woodland scene, but die in a tropical garden. Mix and match is the motto here, but first let's survey the very good plants for bottles and the bad ones that can overrun the garden in a few weeks. And we shall discuss in detail, planting instructions and tools to get you started.

*You'll find, however, that plants suitable for, say, a woodland garden may also be fine for a Japanese landscape, which is why a plant may be listed several times throughout this book.

This wine bottle makes a fine container for plants but the *dracaena* is too large for it and has outgrown its home.

WHAT TO GROW

There is an array of true miniature plants, and these are the best candidates for bottle gardens. They stay small, need little care, and if grown properly are rarely bothered by disease or insects. Mosses and ferns, which are good companions for miniature plants in a bottle garden, are a tremendous group. Most have attractive, colored leaves, are small, and have bushy growth.

For those who dote on flowering plants (and these are truly gems), there are many good ones. Miniature gesneriads like sinningia (dollbaby) with their slipper blossoms, are a

delight, as are small African violets and diminutive orchids, that include some no larger than a thumbnail. And don't forget tiny flowering begonias, robust and always desirable in a miniature garden; their pink or white perky flowers add grace and color to any arrangement. Miniature roses and geraniums can't be ignored either, although they may be somewhat more difficult to grow than other plants mentioned here. Still, they are stellar plants when viewed under glass (see chapter 4).

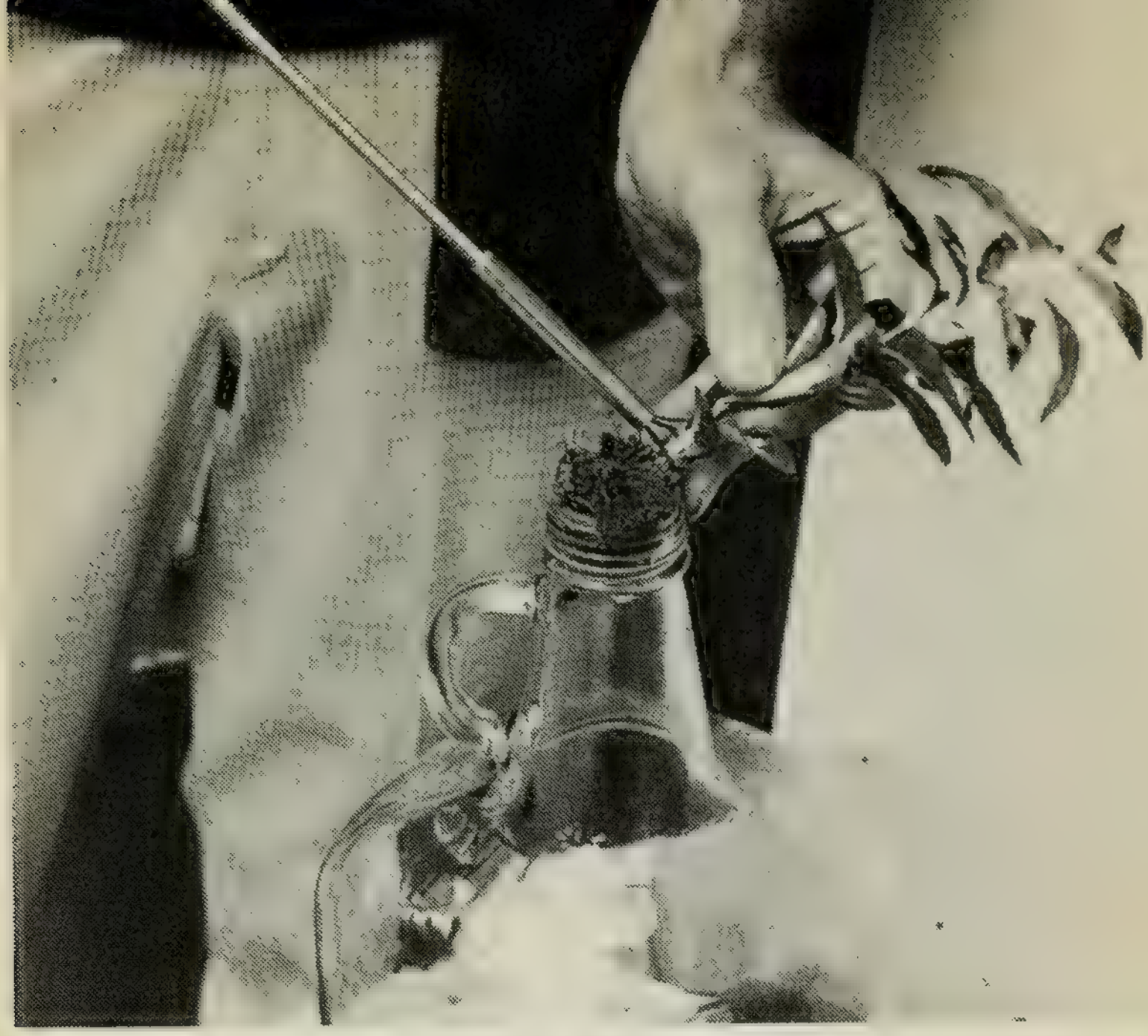
Seedlings of standard-sized houseplants can also be

Planted with appropriate plants, a water bottle garden can be handsome for many months. Plantings are in proper scale to the container.

grown, but in time they will outgrow the garden and will have to be removed, at which point they can be potted for windowsill growing. I freqently take small crown divisions of my larger houseplants and use them in bottle gardens. There are many houseplants you can do this with: *philodendrons, pileas, marantas,* small palms, grape ivy, etc.

Venus flytraps and other carnivorous species are difficult to raise on a windowsill, but they flourish in bottles. If you grow insect eaters—and I admit they are novel—grow them by themselves in suitable bottles. Incidentally, these insectivorous plants are miracles of nature, and the mechanism that regulates their assimilation of their victims—small insects—is downright incredible. Don't, however, feed them ground meat; it won't work. They grow fine with an occasional fly as food.

Packaged tools for planting bottle gardens include a dowel stick, a wire with loop at end, and the pickup tool.



The pickup tool has a claw at one end operated by a plunger at the other end.

WHAT NOT TO GROW

Although there are many plants for bottle gardens, there are also some that should be avoided at all costs. Plants such as baby's tears and certain *selaginellas* are known as rampant growers. They spread quickly and eventually smother a garden, choking off other, more worthwhile plants. Plants such as *cineraria,* and the old-fashioned wax plant should be avoided too because they simply attract too many insects to make them worthwhile in the garden. *Coleus* and *plectranthus,* two excellent house plants, should also be grown with discretion since they grow quickly and can engulf a garden.

Slender, stiff-looking plants such as some *sansevierias* also do better when grown at windows because they provide little grace or beauty in a terrarium. Bushy plants and those with graceful lines are the kinds of plants you should have to make your glass garden a stellar display.

TOOLS

When I first started bottle gardening in 1964, there were no commercial planting tools on the market. So I devised my own tools: pieces of coat hangers fashioned into long lengths, looped and curled at the ends to grasp plants, and dowel sticks for patting down soil around plants. They were hardly machine-designed tools, but with patience I succeeded in planting the garden. Then I discovered an auto mechanic's tool called a pickup; one end had a wire claw which was operated by a plunger at the other end. Originally designed for picking up nuts and bolts from inaccessible places, this handy gadget served me well for years and I used it to plant dozens of bottles. Now this tool, along with other planting helpers (wooden dowels, etc.) is available in a package kit at nurseries. The pickup tool itself can still be found at larger

Plants being inserted into garden with the pickup tool.

hardware stores. (In our photos showing gardens being put together, you can see various tools).

You will definitely need some of these special tools to plant your garden properly. Or of course you can make your own as I did, from coat hangers or heavy gauge wire. But no matter which tools you decide to use, practice first. It takes a little time to properly learn to manipulate wooden dowels and flexible, long gadgets with ease. However, once you have the basics you can plant almost any bottle provided the opening is about 1 inch in diameter. (I suppose you could plant narrower necked bottles too, but that is beyond my patience!)

4 FAVORITE BOTTLE GARDEN PLANTS

Ferns, with their graceful fronds and lacy stems, are excellent plants for small enclosed gardens. And miniature gesneriads, begonias, African violets, and orchids head the list of flowering plants for bottle gardens. Diminutive roses have their value too, although they are not easy to coax into bloom. Each group has stellar varieties that make any glass garden come alive with color. African violets are old favorites, perhaps because they require only bright light to bloom. Begonias and geraniums need some sun but not too much, or, as cautioned before, in the confines of a bottle, they may be desiccated by the heat.

Orchids too can be grown in glass and do very well, better than on a windowsill, because many orchids require only bright light to bring them into bloom. The variety in miniature orchids these days is staggering, so do investigate these fine *inexpensive* plants. You can find some of these delightful plants at florists' shops, but the majority are specialty plants and must be ordered from mail-order suppliers.

AFRICAN VIOLETS

These popular plants are stellar attractions in glass gardens because their handsome foliage and bright flowers offer the gardener a chance to be a professional. Some bloom on and off throughout the year; others are seasonal. But even without flowers, African violets look attractive.

Grow plants in two parts garden loam to one part each charcoal, sand, peat moss and leaf mold. Plants must have a spongy humusy mix so the roots can breathe and excess water can drain through the soil. During the day, let air circulate within the container: remove the stopper for an hour or so or plop matchsticks under the rim of the cork. Give plants bright light but no sun, and watch gardens for signs of mildew or botrytis, which is evidenced by gray mold on plants. Dust plants with a fungicide (Captan or Zineb) if the disease starts (also discussed in chapter 7).

Try the following varieties in your bottle garden.

Honeyette. Double red-lavender flowers. Only 5 inches across.

Lavender Elfin Girl. Lavender blooms; ruffled and fluted foliage.

Minneapolis. Double Pink flowers; plain green leaves.

Ferns add charm to any bottle garden; this is a closeup study of the beauty of the fronds.

Pteris ferns make ideal bottle garden plants; there are many varieties.

Pink Rock. Single pink blooms; outstanding quilted leaves.

Sweet Sixteen. Double white flowers; scalloped spoonshaped leaves.

Tinkle. Lavender flowers; fluted and ruffled foliage.

Tiny Bells. Single dark blue flowers; quilted dark green leaves.

Wendy. Large blue flowers; quilted leaves.

White Doll. Tiny plant with fine white flowers; blooms when only 2 inches tall.

BEGONIAS

In winter and early spring, when color is scarce, minature begonias in the bottle garden come to the rescue—they bear charming bowers of cascading flowers with little effort. Plants grow slowly, and once established in the container, give a harvest of bloom even without sun.

The family is large. There are hairy-leaved (hirsute), angel-wing, and rhizomatous (with sculptural rhizomes),

begonias; within each group there are miniatures to delight any minigardener.

Begonias love the warmth and humidity of closed containers and need a soil of equal parts garden soil, leaf mold, and sand. Handle plants carefully when inserting them in the bottle because some have succulent stems and break easily. The following miniature begonias are ideal for your bottle garden:

B. aridicaulis. Tiny green leaves, white flowers; perfect for terrariums.

B. boweri. Green leaves with black-stitched edges. A dramatic plant.

This dwarf geranium is Polaris and is well suited for small glass gardens.

Geranium Gypsy Gem is tiny and lovely; adds fine color in the miniature scene.

B. Chance Mottled leaves, pink flowers. Good color contrast.

B. China Boy Bright-green leaves, red stems, and pink blooms.

B. dregei. Bronze-red maple leaves, branching habit. Picturesque growth.

B. griffithi. Heart-shaped irridescent leaves. A real exotic.

B. hydrocotylifolia. Round dark green leaves. Small and handsome.

B. lulandi. Bright-green leaves; pink flowers. Always good.

B. Red Berry. Wine-red Rex type. Luxuriant foliage.

B. Red Wing. Wine-red flowers; silver edges on leaves; Rex type.

B. Rosa Kugel. Small green leaves; wax begonia. Tiny but popular.

B. rotundifolia. Apple-green leaves, pink blooms; handsome small plant.

B. Star Bright. Silver and green foliage; Rex type. Always good.

B. Winter Jewel. Frosty green leaves; white blooms. A real beauty.

Geranium Saturn is another small excellent plant.

Geranium Alpha is always a good choice for terrariums.

FERNS

Few plants can match the beauty and grace of ferns. The miniature and smaller species are especially enchanting and make perfect bottle garden subjects. If you are fond of ferns but have had trouble growing them at windows, do try them in the miniature garden.

You can use a few ferns with other plants in a bottle garden, or you might want to have a fernery (all ferns) (Drawing 4). The preparation of the fernery is the same as for other bottle gardens. Ferns look delightful when tucked between small stones, so make careful arrangements, paying attention to shaping the soil in graceful lines.

There are many ferns you can grow, but here we list the smaller ones that are suitable for the bottle garden:

Adiantum capillus veneris (Southern maidenhair fern). Erect and spreading, growing to about 14 inches; bright green with black wiry stems.

A. cuneatum (Delta maidenhair fern). Full and bushy, with somewhat large, medium green fronds.

A. hispidulum. Bright green and graceful; stays small with pruning.

Drawing 4

Begonia *speculata*

Asplenium bulbiferum (Mother spleenwort). Upright flowing fronds; delicately scalloped. Select small plants.

A. trichomanes (Maidenhair spleenwort). Good small fern (to 8 inches) with toothed fronds.

Davallia mariesii. Fronds 8 to 10 inches long; soft green color. Exquisite for bottle gardens.

Humata tyermannii (Bear's foot fern). Often available at local florists. Small, lacy, and lovely.

Lygodium scandens (Climbing fern). A climbing fern with apple-green foliage. Wiry; tiny green leaves. Excellent.

Begonia Elsie M. Frey

Microlepia strigosa. A small and handsome lacy fern. Good one.

Pellaea rotundifolia (Button fern). Tiny and delightful, with dark green button-shaped leaves.

Pteris. A large group of ferns with many stellar small ones. Most have leaves that look like ferns, but others depart from the conventional pattern. Generally called "brake" ferns. *P. cretica* and its many varieties have been good plants for me.

GERANIUMS

Geraniums have been indoor gardners' favorites for years, and they offer excellent color. Some are intolerant of a stagnant atmosphere, however, so be sure to leave bottles open rather than tightly closed. Use porous and rich soil, one part greenhouse soil to one part sand, with some fine perlite. Give geraniums as much sun as possible but not so much that plants cook; east morning sun is best.

Begonia *lulandi*

Begonia *dregei*

These diminutive flowering gems need an evenly moist but never soggy soil, so check growing medium frequently. Insert a dowel stick with one end wrapped in dry onionskin paper ½ to 1 inch into the soil. Inspect the paper to determine just how moist the soil is. If it is too moist, set the bottle garden in a dry shady place. If it is too dry, insert the stopper until condensation appears on the glass and soil becomes moist.

Some good miniature varieties of geraniums are:

Alcyone. Pink flowers; leaves 1½ inches in diameter. Flowers at 2 inches.

Aldebaran. Dark pink flowers; leaves dark green zoned with blue-green.

Altair. Salmon pink; intense green. Lovely plant.

Antares. Red flowers; rich black-green leaves. Handsome contrast.

Capella. Salmon pink blooms; forest green foliage with darker markings.

Kalanchoe Coral Bells

Fairy Tales. Ruffled white flowers; dark green leaves.

Filligree. Salmon pink blooms and fine tricolored foliage. Don't miss it.

Goblin. Bright double red flowers; compact. Good plant.

Imp. Pink flowers; dark foliage. Very tiny plant.

Merope. Red, almost black, blazing blooms; dark leaves. Handsome.

Meteor. Dark red double flowers; green foliage banded with black.

Pygmy. Bright red blooms; apple-green leaves. Rarely grows more than 6 inches tall.

Polaris. White, pink-edged flowers; small dark leaves.

Red Comet. Cherry red flowers with a white spot; foliage almost black-green.

Rober's Lavender. Large lavender flowers on a small plant.

Ruffles. Ruffled slamon-colored blooms; bears when only 2 inches tall.

ORCHIDS

Miniature orchids were scarce at one time, but now many are generally available from suppliers. These handsome plants have incredible flowers, some no larger than a pinhead, and others grow to 2 inches in diameter. Colors vary from orange to green, brown to tan. Most species are only a few inches tall.

African Violet, (double pink form)

Cirrhopetalum cumingii, orchid

These orchids, which do very well in bottle garden conditions, require fir bark or osmunda (both sold at local nurseries) to grow. If you completely use orchids, don't insert a soil base. However, if there are only a few orchids in the bottle, make planting pockets filled with fir bark or osmunda.

There are many groups (genera) of orchids that contain miniature plants; you'll have to ask for plants by botanical name (as listed here) to get the right ones.

Orchids are really jewels under glass. Try the following:

Aerides crassifolium. Leaves 6 to 9 inches long; pendant spikes of lovely purple flowers about 1 inch in diameter. Fragrant.

A. japonicum. Straplike leaves to 4 inches; flowers red and white. Fragrant.

Angraecum compactum. A miracle of nature, with leaves only 2 inches long and beautiful 2-inch white flowers.

A. falcatum. One-inch blooms with slender curved spurs. Straplike dark green leaves.

Ascocentrum ampullaceum. Eight inches tall and a real gem; 1-inch brilliant red flowers.

Restrepia elegans, orchid

Ornithocephalus bicornis, orchid

A. calceolare. Small yellow and white flowers; dark green foliage.

A. curvifolium. Blazing red flowers; plant is 4 inches tall.

A. miniatum. Dozens of bright orange flowers.

Broughtonia sanguinea. Solitary green leaves only a few inches high. Branching scapes carry 1-inch brick-red flowers.

Bulbophyllum barbigerum. Produces an intricate flower with tufts of purple-brown hairs. Several blooms to a scape.

B. lemmniscatoides. Small, dark purplish flowers; the sepals have white hairs and a white and spotted red trailing ribbon appendage. A true oddity of nature.

B. medusae. Now available for the first time at modest prices. The flowers are dense heads of straw-colored blooms. Also known as *Cirrhopetalum Medusae.* A curiosity.

B. morphologorum. A thrusting stem carries several hundred tiny yellow-brown flowers. Most unusual.

Cirrhopetalum cumingii. Tiny, to about 1 inch, with brilliant red and pink flowers in the shape of a half circle.

C. gracillum. Slender scapes that carry crimson-red flowers.

C. roxburghii. An umbrella of pink flowers; dark green foliage.

Gastrochilus bellinus. Leathery green foliage and yellow and purple-white flowers. Tiny.

G. dasypogon. About 10 inches high; masses of bright yellow flowers.

Masdevallia angulata. Small; red flowers are produced on tall scapes. Symphony of color in bloom.

Bulbophyllum morphoglorum, orchid

One of the fine minature roses.

M. bella. About 10 inches tall. Bears a pendant scape with large triangular flowers; yellow sepals spotted red with dark tails.

M. caudata. About 5 inches high. The upper sepals are yellow spotted and veined red; lateral sepals are almost purple. Always desirable.

M. coccinea, sometimes called *M. harryana.* Clusters of glossy green leaves. The waxy flowers are about 4 inches long, ranging from pale yellow through orange or scarlet to purple. Usually spring-blooming, this is one of the easiest of the bunch to grow. Will succeed on a windowsill.

M. coriacea. Glows with a purple-spotted yellow flower and has typical fleshy leaves. Grow this one very cool, say 50° F at night, if you want bloom.

M. cupularis. Glossy chocolate-spotted brown flowers. Easy to grow.

M. doris. A hybrid. Lovely tublar flowers held high above the foliage. The blooms are a delicate orange shade.

M. erythrochaete. Somewhat larger, about 9 inches. White flowers shaded with yellow and spotted with purplish red; white lip is shaded pink. The tails are 2 inches long and purplish red.

M. horrida. Two-inch leaves and tiny greenish-yellow triangular flowers dotted with red. Blooms almost 6 months of the year.

M. ignea. A handsome species with a cinnabar red flower, striped crimson. The plant, 10 inches tall, has erect scapes, and most often blooms in spring for me. Popular and available.

Ornithochilus grandiflorus. Erect scapes of pale green flowers.

O. inflexus. About 5 inches high; tiny greenish-white flowers. Straplike foliage.

Pleurothallis chrysantha. Radiant, with tiny burnt-orange flowers. Almost everblooming.

P. longissima. A 9-inch plant with erect scapes of whittish-yellow flowers.

Restrepia antennifera. A superb 1- to 2-inch plant; bright flowers with a spoonshaped lip.

R. elegans. Somewhat smaller than above, but equally handsome.

ROSES

Miniature roses are diminutive replicas of their larger cousins. The delightful tiny flowers are delicate and glisten like wax when placed behind glass. Plants rarely grow more than 14 inches (most are about 6 inches) and are readily available from suppliers.

The plants need some sunlight to bloom; grow them in bottle-dome gardens or jars with wide mouths so air can circulate within the confines of the container to reduce heat. Use a good rich soil, and watch for red spider mites, which love roses even under the best conditions. If an infestation does occur, don't panic. Apply a miticide to the plant; ask your nurseryman for the best one (see chapter 7).

Here are some roses to try:

Bo-Peep. Lovely double pink flowers; prolific bloomer.

Cinderella. Old standby with pink, full flowers; like coolness (60° F).

Lilac Time. Only 8 inches tall; bears splendid lilac flowers.

Lollipop. Fine variety, with splendid fiery red flowers.

Midget. Wee rose; small and fragrant deep rose flowers.

Pink Heather. Blooms abundantly with double pink flowers.

Pixie. Well-known and adored; tiny white flowers. Very small.

Red Imp. Intense red flowers make this one outstanding.

Westmont. Rather large (almost 1 inch) double cherry red flowers.

5 MORE BOTTLE GARDEN PLANTS

The plants listed in chapter 4 may be the favorites, but the following ones should not be overlooked because they are just as beautiful although perhaps not as well-known. This group includes such plants as *ficus pumila*, a button-leaved dark green beauty; dwarf bamboo and rainbow-colored *cryptanthus* species; slow-growing *peperomias* and *pileas*, with bright green perky leaves; and diminutive *columneas* and *campanulas.*

The following list is divided into foliage and flowering plants for easier selection. Also included in a special section are low-growing ground covers that clothe the soil in emerald green.

FOLIAGE PLANTS

Acorus gramineus pusillus. Tuftlike grassy leaves; 2 to 3 inches high. Excellent bottle plant.

Aechmea racinae. Ten-inch bromeliad with shiny dark green straplike leaves; rosette shape.

Calathea insignia

Aglaonema pictum. One of the best foliage plants, with blue-green leaves splashed with silver. Somewhat large, but can be trimmed to desired shape and size.

Alternanthera bettzickiana. Bright miniature with yellow, pink, red, and green foliage. Group a few of these in one area for some concentrated color.

Anthurium scherzerianum (Flamingo plant). Attractive green leaves; red shiny bracts.

Bambusa nana. Grassy plant that needs severe pruning; use only a few shoots.

Bromeliads. See *Cryptanthus.*

Caladium. A group with many varieties well-suited to

diminutive landscapes. Try *C. humboldtii*–small deep-green leaves marked with silver; "Little Rascal"–lance-shaped wine-red foliage; or "Twilight"–flaming pink leaves netted with green. These plants may die down in winter; if so, lift them from the garden.

Calathea bachemiana. Not really a miniature but a lush plant with velvety gray-green leaves edged with dark green. Also handsome is *C. picturata argentea,* with silver leaves etched in dark green.

Ctenanthe oppenheimmana tricolor

Calathea makoyana

Ceropegia cafforum. Climber, with dark green leaves, red underneath. Another dainty species is *C. Woodii* (Rosary vine), with heart-shaped blue-green foliage with silver veins.

Chamaeranthemum igneum. Tropical creeper with velvety bronze-brown leaves and pink veins.

Chlorophytum bitchetii. Rosettes of lovely green grassy leaves with white stripes.

Codiaeum variegatum pictum (Croton). Bushy plant that needs pruning to keep it small. Has bright-green leaves spotted with yellow.

Crassula cooperi. Three-inch leathery leaved plant. *C.*

schmidtii is also handsome, with its red-tinted leaves. Many other small species available.

Cryptanthus bromelioides tricolor. One of the best small bromeliads, with rosettes of green leaves striped pink and white. *C. bivittatus* (*roseus picta*) bears bronze-pink foliage striped pale green. *C. acaulis* has bronze-green foliage; *C. terminalis* has bronze-green foliage, and *C. beuckerii* has pale green foliage.

Dionaea muscipula (Venus fly trap). Carnivorous plant with curious growth; always causes comment.

Dracaena godseffiana. Slow-growing yellow and green leaved plant. Prune to keep small.

Agloanema commutatum

Scindapus aureus

Tolmiea menziesi

Drosera rotundifolia. Tiny insect eater; spoon-shaped growth covered with red hairs tipped with a stickly substance. Insect landing on plant is trapped and pulled into plant.

Ficus radicans variegata. Dainty foliage creeper; silver-green leaves marked white. Also desirable is *F. repens pumila*, with heart-shaped dark green foliage; sends out disks that cling to glass.

Fittonia verschaffeltii (Mosaic plant). Creeper with irridescent foliage; grows slowly and remains dwarf size.

Haworthia limifolia. Small succulent with ribbed leaves.

Hedera helix. (see special section at end of list). Large group of delightful ivies; many well-suited for the glass garden.

Helxine soleirolii (Baby's tears). One of the most refreshing wee creepers around, with buttonlike bright green leaves. Rampant grower; use sparingly.

Malpighia coccigera (Miniature holly). Glossy green leaves and pink flowers. Robust.

A group of *peperomias: p. sandersi, p. hederfolia, p.* Blackie, *p.* Silver Heart and *p.* Green Ripples

Pilea serpillacea (left), *Pilea microphylla* (right)

Manettia bicolor (Firecracker vine). Climbing vine that rarely fails to bear red and yellow flowers; after blooming, cut back to keep small.

Maranta oppenheimiana tricolor. Stellar foliage plant with flowing multicolored foliage. Also try *M. Leucuheura kerchovena.*

Monanthes muralis. Dwarf succulent that grows low; pretty.

Muehlenbeckia nana. Mat-spreading creeper, with small dark green foliage.

Nerium oleander (Oleander). Pink or white flowers on young plants.

Pandanus veitchii. Striped yellow and green leaves; young plants are best.

Pellionia repens. Creeper with elliptical metal-green foliage; stays small.

Peperomia. A group of many miniatures, most with heart-shaped or oval leaves. Try "Little Fantasy"—silver-green and brown leaves; "Pixie"—bright green leaves; *P. rubella* moss-green foliage; and *P. obtusifolia*—variegated foliage.

Philodendron sodiroi. One of the small philodendrons. Heart-shaped leaves. Keep trimmed.

Pilea. A genus of fleshy creepers. *P. cadierei minima* (Aluminum plant) has silver-green foliage; *P. depressa* has sea-green toothed leaves; *P. nunmulariaefolia* has heart-shaped fuzzy green leaves; *P. repens* has tiny, round bronze foliage; and *P. microphylla* is a tiny-leaved beauty.

Sansevieria (Snake plant). Some varieties are low-growing; ideal for the glass garden. "Hahni"—a spiral of broad

Pilea repens, Pilea involucrata (left)

dark green leaves; "Golden Hahni"—green leaves marked with yellow.

Saxifraga. Dozens of these beauties for bottles; most only a f inches high and slow growing. Excellent for gardens.

Sc. psus aureus. Handsome heart-shaped leaves; keep pruned.

Sedum. Another group of plants with many diminutive gems. Most have small, succulent leaves. Try *S. dasyphyllum, S. pachyphyllum,* and *S. stahlii.*

Selaginella kraussiana brownii. Creeping grass-green mossy plant. *S. uncinata* is another fine one, with blue-green tiny leaves.

Syngonium podophyllum. Beautiful 8-inch plant, with arrow-shaped leaves.

Pellionia pulchra

Acorus gramineus variegatus

Tillandsia ionanthe. Tufted gem with small rosettes of brilliant green leaves turning red at bloom time.

Ivy

Miniature or semi-dwarf varieties make excellent plants for the bottle garden; there are many to choose from. Select

Zebrina pendula quadricolor

the small-leaved types for best show. The scalloped leaves are especially handsome in glass. Don't settle for plain green ivy because there are all kinds: marbled, apple green, dark green, and variegated. Use them as foils for other plants in your bottle gardens.

Remember that ivy doesn't want sunlight; it likes bright light. Keep gardens as cool as possible; and be on the lookout for scale or spider mites, which sometimes attack ivy plants. Use aerosol spray if infestation occurs.

Ivy has been extensively hybridized, and there are many varieties. Here are some for the glass garden:

California Gold. Compact and bushy, with pale green leaves splashed with yellow.

Curlilocks. Fluted and ruffled apple-green leaves; nice, but grows quickly, so use with discretion.

Glacier. Variegated green-gray and white leaves makes this one outstanding.

Green Feather. Very small ivy perfectly suited to bottle gardens.

Green Ripples. Another small ivy, with 1-inch leaves.

Jubilee. Variegated ivy. Some leaves almost pure white. Stellar accent for small gardens.

Merion Beauty. Grows quickly, but a nice small one with handsome leaves.

Needlepoint. Not to be missed; 1-inch leaves deeply lobed.

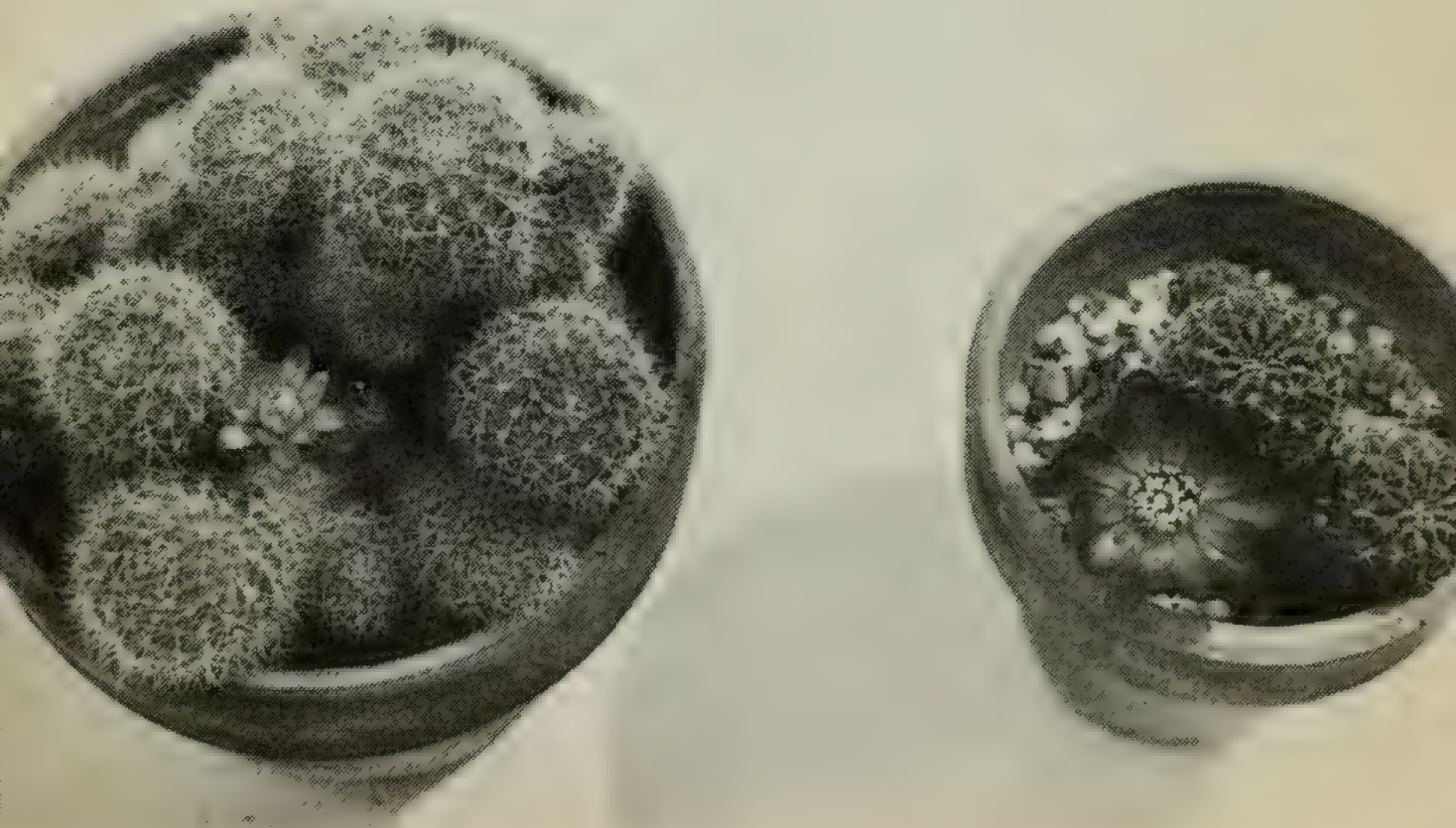
Pixie. Another superb miniature ivy, with leaves about 1 inch long.

Walthamensis. Small leaves with silver white veining; good color.

FLOWERING PLANTS

Achimenes. A large group of summer-flowering plants with open-faced blossoms and dark green leaves. Start rhizomes in spring.

Rebutia species (left), *R. pulvinosa,* (right) *R. senilis*



Haworthia species (left to right): *H. cymbiformis, H. margaritifera, H. fasciata*

Azalea Gumpo. Delightful small variety with frilly fire-red flowers.

Bertolonia maculata. Miniature with dark green, silver, and red foliage. Very appealing.

Allophyton mexicanum. Only 4 inches high. Dark green leaves; lavender and white flowers. Almost everblooming.

Campanula. Many varieties; mostly small plants with lovely white or blue flowers.

Chrysanthemum multicaule. Bright-yellow flowers; for a large bottle.

Coleus rehneltianus. Highly colored plant that can be kept small by pruning and blooms with white flowers.

Columnea hirta. Dark green hairy leaves and spectacular orange flowers.

Crossandra infundibuliformis. Fine shiny green-leaved plant with crown of orange flowers. Blooms young.

Cyclamen coum. Favorite red flowering plant with dark green round leaves.

Dianthus glauca nana. Not often seen, but satisfactory for the small glass garden. Bright pink flowers.

Episcia dianthiflora. Velvety leaves of intense green and white flowers; small and dainty.

Exacum affine. Gentian that bears blue flowers.

Fragaria indica. Small trailing plant with bright yellow flowers. Use with discretion; takes over a bottle garden.

Hypocyrta nummularia. Another fine gesneriad, with small shiny green leaves and pretty orange flowers.

Partridge berry *(Mitchella repens)* a fine woodland plant.

The lovely dainty goldthread *(Coptis trifolia).*

Impatiens. Look for dwarf variety 'Red Elfin,' with bright cheery flowers.

Kalanchoe blossfeldiana. Many varieties; small red flowers.

Kohleria amabilis. Silver-green leaves and tubular pink flowers.

Oxalis. A fine group, with two excellent small species for

Pipsissewa, a delightful woodland plant.

Lycopdiums, fine mosses for tiny gardens.

glass gardens: *O. hedysaroides rubra,* with bright golden flowers, and *O. henrei,* bearing tiny yellow blooms.

Punica granatum nana (Dwarf pomegranate). Lovely little-leaved tree with red flowers. Prune and shape as desired.

Rhipsalidopsis rosea. Tiny and lovely; fine cactus with rose-pink flowers.

Saxifraga sarmentosa (Strawberry geranium). Favorite, with round, hairy, and silver-veined leaves. Bushy and always attractive.

Schizocentron elegans (Spanish shawl). Creeper with tiny leaves and purple blooms.

Sinningia pusilla. One of the finest miniatures. To 1 inch, with stellar pink blooms. Not to be missed.

Streptocarpus. Gesneriads that offer a great deal of color for little effort. Try *S. Rexii*—pale orchid flowers with purple throat, and *S. saxorum*—lavender-white blooms.

A group of popular *selaginellas* for covering soil in small gardens.

Campanula isophylla alba

Tradescantia multiflora. White flowers makes this appealing. Will bloom in a bottle garden.

GROUND COVERS (MOSSES)

Ground covers and mosses are indispensable in the bottle garden because they clothe the soil with verdant green, and offer grace. My favorites are Irish moss, Scotch moss, and chamomile. Essentially, ground covers are outdoor plants; you'll find them at nurseries in 6 x 10-inch containers. Many will adapt to the conditions of a glass container providing they have constant shade and moisture; indeed, that is the

only way to grow them at home. Note that here we are discussing creepers and mosses rather than large ground covers like ajuga or hypericum.

Besides looking good, mosses serve a valuable function in the bottle garden because they immediately soak up excess water, thus preventing a stagnant situation.

To plant ground covers (they must be planted immediately), push tiny pieces through the opening of the bottle.

Oxalis hedysaroides

Episcia dianthiflora

Push them into place with a dowel stick, making sure they are well-inserted in the soil; if they just rest on top, they will soon die.

Here are some ground covers to try in your bottle garden:

Alyssum wulfenianum. Low and compact, with grayish foliage.

Anthemis nobilis (Chamomile). Lovely narrow leaves. Grows easily and smells good too.

Crassula schmidtii

Arenaria verna caespitosa (Irish moss). Yellow-green vibrant color; my favorite.

Asperula odorata (Sweet woodruff). Grows somewhat tall, to about 8 inches. Fragrant.

Helxine soleirolii (Baby's tears). Popular with tiny dark green leaves. Use with caution because it spreads quickly.

Mentha reguienii (Corsican mint). Small leaves and fine green accent.

Nepeta hederacea (Ground ivy). Round- or kidney-shaped leaves; do not confuse with English ivy.

Ivy comes in many varieties; here are three of the small-leaved kind.

Sagina subulata (Scotch moss). Lovely dense mat. *S. subulata 'Aurea'* is golden green.

Sedum (many kinds). Several small-leaved species; mostly button leaves that are dark green or brown-green.

Thymus (Thyme). Many species. Small leaves. Good creeper.

Veronica repens. Creeping mosslike plant with tiny leaves.

6 PLANNING AND PLANTING

The space within your glass container is similar to an outdoor garden (although much smaller, of course). Just where do you start, what goes in the bottle, and how will it make the picture? The garden can be tropical and lush, or it may be shady and woodsy like a glen. It might be a formal scene reminiscent of majestic gardens or simply a single plant. *You* are the landscape architect, designer, and arranger.

No matter what type of garden you want, you'll find that it must be in a balanced and effective setting and that scale and proportion must be observed. Don't just throw in plants and expect a unique garden. Planning is necessary even on a small scale since every leaf and stem is important. In a regular garden there is room for error but not in the diminutive landscape.

Consider these six factors when you design the garden:

1. Harmony
2. Rate of growth of plants
3. Compatibility
4. Type of setting—formal, informal, etc.

5. Size of plant
6. Scale and balance

THE LANDSCAPE

You don't want to crowd the garden, yet you want enough plants to make an attractive landscape. Generally, the floor of the garden should be covered; bare soil is rarely pleasant to look at. This means that ground covers and mosses must be employed with good taste. Use aquarium gravel in small amounts to add contrast and color. Use restraint, but don't make the setting stark. A stark appearance works outdoors but rarely in a bottle.

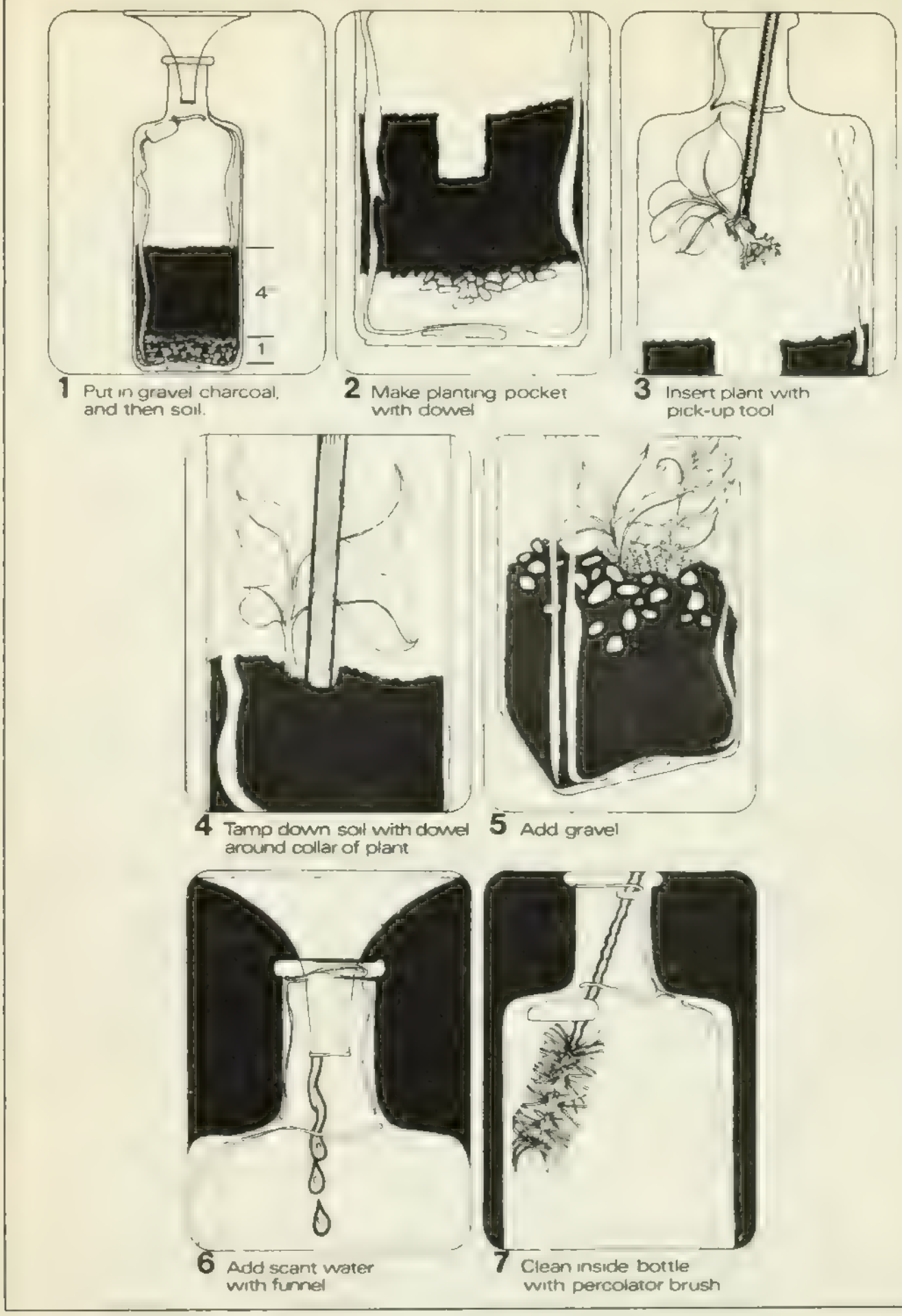
A flat terrain is not interesting, so vary the contour of the soil. Mound hills and create valleys. Create a center of interest with a hill in the rear, and allow a slope to the front of the container so that the eye travels along lovely greenery to taller plants in the back. To the left and right of the plant let the soil rise in each direction to some degree but not as steep as the focal hill.

Pad and tamp with tools until you create a definite land contour, or retain the slope of the entire terrain to one side. Use a semi-circle of tighly packed aquarium gravel to create soil mounds. This requires meticulous landscaping but it is worth the effort.

DESIGN

To start your garden, place taller plants in the rear as background material. Then work forward, locating shorter plants in the central area. At the sides, keep the planting low. In the rear, use large-leaved plants, and at the sides use medium height plants. In front, concentrate on the really diminutive-leaved subjects. You want to achieve variation in leaf size and color. All plants of the same green are monotonous, so use dark green with apple-green foliage, for example. The foreground or front planting is the invitation to lead the eye into the garden. Be sure it is harmonious with the other plants. Use low-sprawling or bushy plants.

The above are general rules, but there are always


PLANTING NARROW BOTTLE
4
1
1 Put in gravel charcoal, and then soil.
2 Make planting pocket with dowel
3 Insert plant with pick-up tool
4 Tamp down soil with dowel around collar of plant
5 Add gravel
6 Add scant water with funnel
7 Clean inside bottle with percolator brush

Drawing 5

exceptions, such as planting both sides of the container with tall plants, which creates a formal but handsome picture. In this arrangement there is no center of interest, but the perfect balance acts as a definite focal point.

If, after you have planted the garden the picture doesn't seem right, do remove and replant; just don't let it go. Move a few things around until you get the effect you want.

Remember that it may take more time, but once planted, that's it—you have little more to do other than to enjoy the garden. And, above all, don't let the challenge of the narrow neck defeat you. That is part of the game, and after a few experiments I'm sure you'll get the idea.

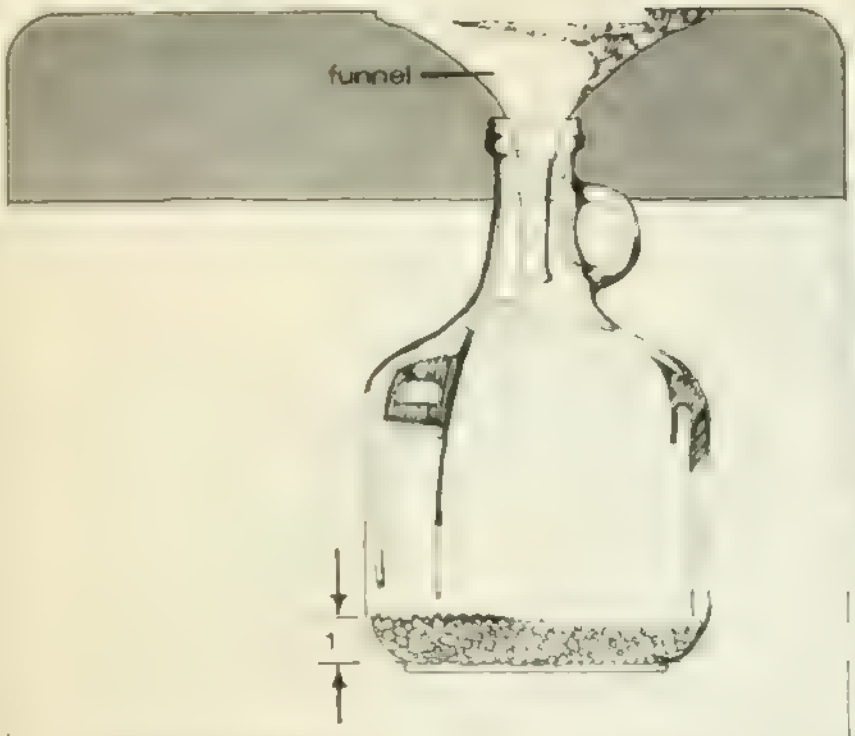
Design Tips for Square or Rectangular Bottles

These gardens require vertical growers like *acorus* and *chlorophytum.* Place the plants to one side of the bottle, never in the center. Fill the center of the area with very low-growing mossy ground covers or gravel. Avoid bushy-, spreading-, or rosette-type plants because there won't be enough space for them to spread and grow naturally, and once leaves touch the glass their beauty is thwarted. Seek slow-growing or miniature species for the narrow confines of tall bottles (see Drawing 5).

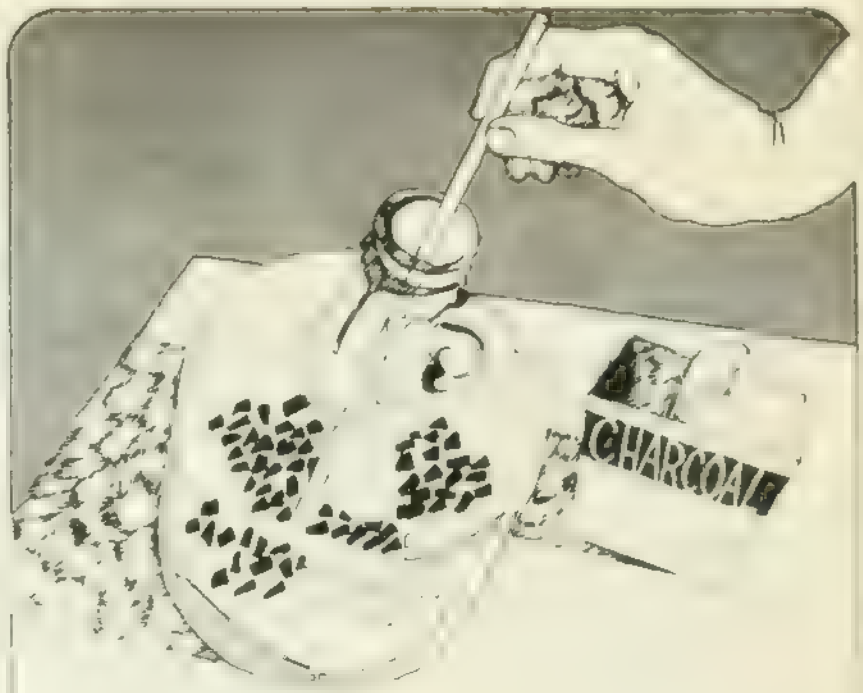
Design Tips for Round Bottles

The round bottle allows you more design latitude and more variety in plants. You can vary the scene with large- and small-leaved plants, and even though the size of the bottle really dictates how many plants and what size they have to be, some general hints apply. Again, the idea is to place the plants so the center area of the bottle contains creeping ground covers or mosses because this is where the eye focuses. Around the center, place the plants in a lush arc of green. Put tall growers in the rear, either on the left or right side, and medium-sized plants in front of them. Also pay attention to leaf size. Use bold large-leaved specimens next to medium-leaved plants, and these in turn next to small-leaved plants. Gradation of leaf size creates rhythm and provides strong eye interest. Use foliage color with a deft hand. Mix and match the various shades of green so they are visually pleasing. The color gradation should be gradual, never abrupt. Start with dark green, then medium green to light green to apple-green and so forth so there will be contrast and drama (see Drawing 6).

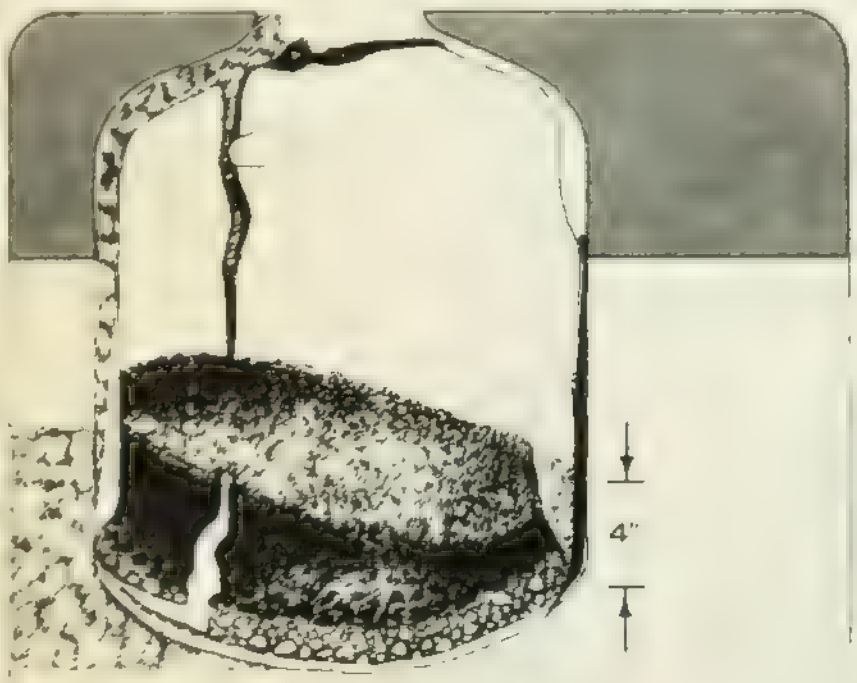
PLANTING A BOTTLE GARDEN



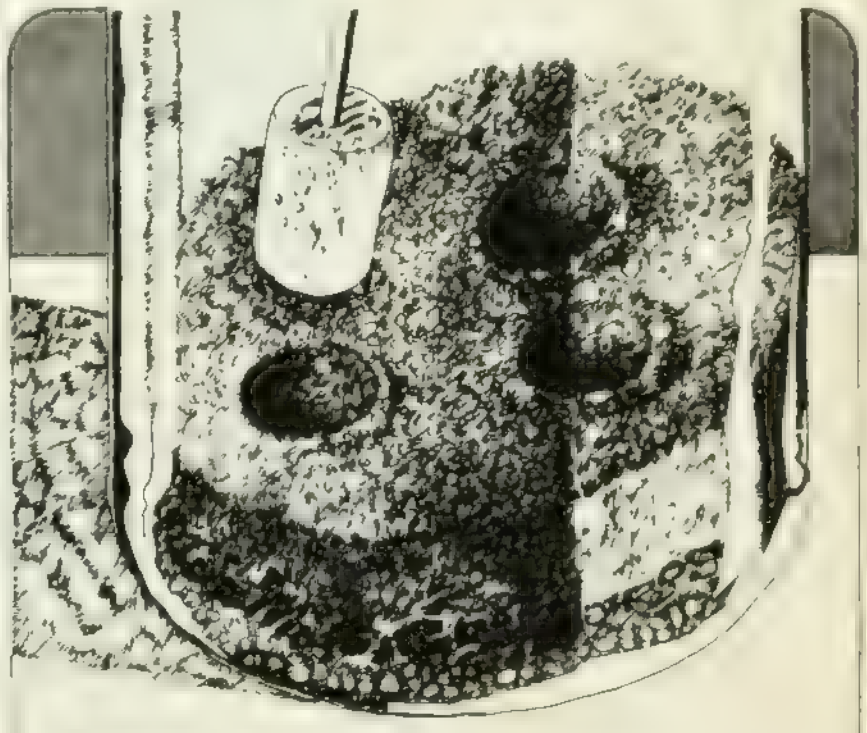
1 PUT IN GRAVEL



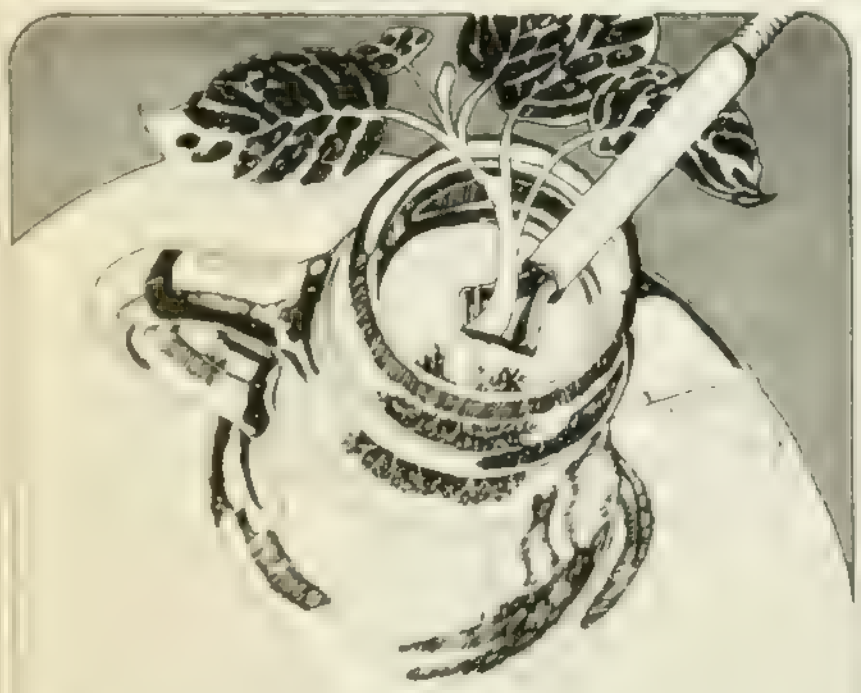
2 SCATTER SOIL AND CHARCOAL CHIPS



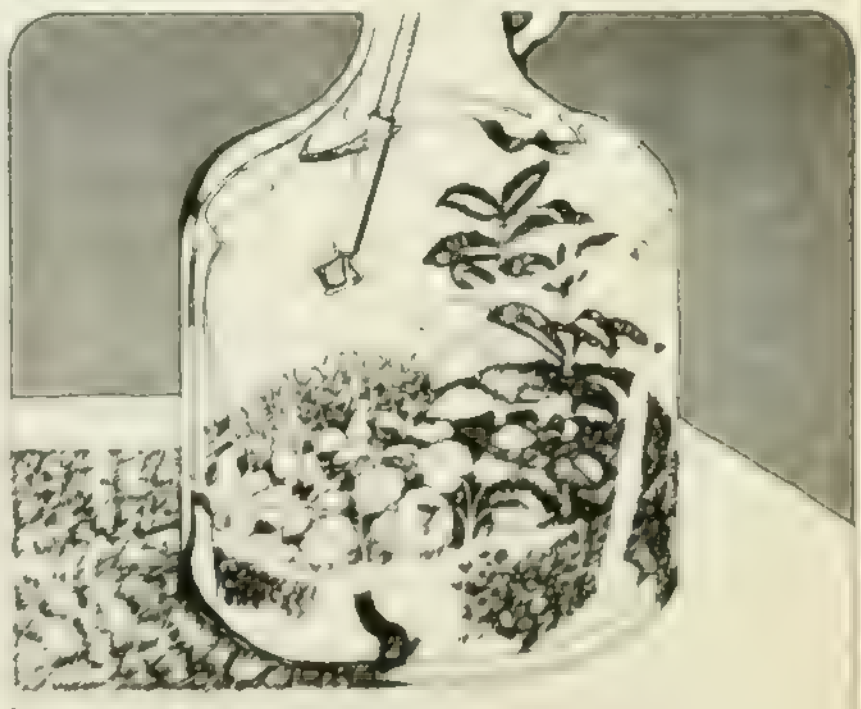
3 PUT IN SOIL



4 MAKE HOLE WITH TOOL



5 INSERT PLANT WITH PICK-UP TOOL.



6 PLANT IN PLACE, WATER SOIL LIGHTLY

Drawing 6

MECHANICS OF BOTTLE GARDEN PLANTING

- Insert a dowel or blunt-edged stick through the neck of the bottle and rotate a round hole in the soil. If the soil is not damp, first dip the end of the dowel in water.
- Remove the plant from the pot and tease away the soil. Place the crown inside the planter tool (in the tongs of the pickup tool or the loop of another tool).
- Push the roots first through the neck of the bottle; lower the plant into the depression formed earlier.
- When the plant is in the hole, slip away the planting tool. While doing this you may have to support the plant with the dowel.
- With the dowel, firm soil around plant roots.
- If you're using rock formations, drop the gravel in place and prod it into position with dowel. This may take a great deal of time—don't rush.
- Clean the neck of the bottle where unwashed roots have muddied things up. Use a planting tool with a cloth or Kleenex attached with a rubber band.
- Pour a little bit of water on the inside rim of the bottle and let it trickle to the soil. Tip bottle to one side and then to the other as you pour water; this will clean the inside of the bottle if it has been muddied.
- Remove any soil from the foliage with a long-handled artist's brush.

When planting is completed, put the bottle garden in a semishaded place. After a week, move it into light or sun, depending upon what the plants need. Remember that moisture doesn't escape, so water only occasionally. Mildew and root rot may occur if the soil becomes soggy and if too much moisture condenses and collects on the glass. If it does, just uncover the garden daily for an hour to let the inside dry out a bit.

You can also start a garden by sprinkling some seed on the soil bed. As the seedlings start growing, pull out the smaller ones, but leave in one or two. I don't recommend this harder method because it is too time-consuming. In addition. you run the risk of accidentally pulling up the focal plant.

Gravel and charcoal set in place in bottle.

Soil being prepared for plants.

Plants in place.

The finished garden.

Gravel poured in place for base.

Soil base being added.

Charcoal chips added to gravel.

The finished garden.

Plants placed in garden.

You usually see water jugs and glass chemical containers, i.e., the large bottles, in an upright position. But, when put on the proper stand, they can be viewed horizontally (see chapter 2). Remember to decide how you wish to view the garden before you start planting.

TO UNDO THE BOTTLE GARDEN

When a bottle garden has become overgrown, or if the plants haven't prospered, you'll have to empty the bottle and start anew. With care it is possible to remove the plants without harming them. The problem here, of course, is that now plants are larger than when they were planted.

Use the pickup tool to remove plants; grasp them by the crown, and pull them up roots first so leaves and fronds will bunch together as they pass through the neck of the bottle. Remove small plants first, leaving the largest ones to the last so you have more maneuvering space.

When plants are out, allow soil to dry for a few days. (Trying to remove moist soil from a narrow-necked bottle is next to impossible.) Once soil is dry and cakey, gently bounce the bottom of the bottle on a wood surface. Then tilt it upside down, and remove soil. Wash the bottle thoroughly and let it dry completely before you replant. Do not wipe with cloth or paper towels because lint may stick to the glass.

7 CARE OF BOTTLE GARDENS

There is more to maintaining a bottle garden than most people think. It is true that most gardens can go untended for many weeks, but really special landscapes with special plants need routine care. Watering is the least important aspect of glass-garden culture, since, as discussed, bottle gardens water themselves. However, ventilation may be tricky. Watch carefully to be sure too much moisture doesn't form on walls. If it does, remove lid or stopper a few hours a day. Cleanliness, routine grooming and cleaning, and light—how much and when—are other important considerations.

As with all successful indoor plant culture, *observation* is the key to success. Watch your plants; if they appear limp and wan, something is wrong. If leaves turn brown for no reason, insects could be at work, or if foliage appears brown at the edges, salts may have accumulated in the soil.

WATERING

You have to water the soil occasionally, although this depends on the size of the container: larger bottles can go

WATERING AND CLEANING GARDEN

1 CLEAN NECK WITH TISSUE

2 POUR WATER SLOWLY AROUND NECK OF BOTTLE

3 APPLY CARBORUNDUM POWDER WITH WATER. ALLOW TO DRY

4 WIPE CLEAN WITH CLOTH

Drawing 7

without water for several months, but smaller ones may need it once a month. If soil seems dry and you think you should water, don't just dump water into the bottle—you'll cause a mess. Mud will splatter over the glass (always difficult to clean), and you may dislodge plants. Water carefully; pour it gently at the rim of the opening, or use a piece of flexible cardboard formed into a funnel and let water run slowly

down the sides of the bottle. This will also help keep inside glass clean (see Drawing 7).

Never water too much. Remember that most bottle gardens don't have drainage holes. Too much water, even with a gravel-charcoal base, can make soil soggy and sour, thus harming plants. If you do get too much water in the container, use a basting tube (sold at kitchen and hardware stores) to siphon out excess water. *Never* tilt bottle to remove excess water.

Do not feed plants in bottles; you want them to stay small and not grow rapidly.

GROOMING AND REPLANTING

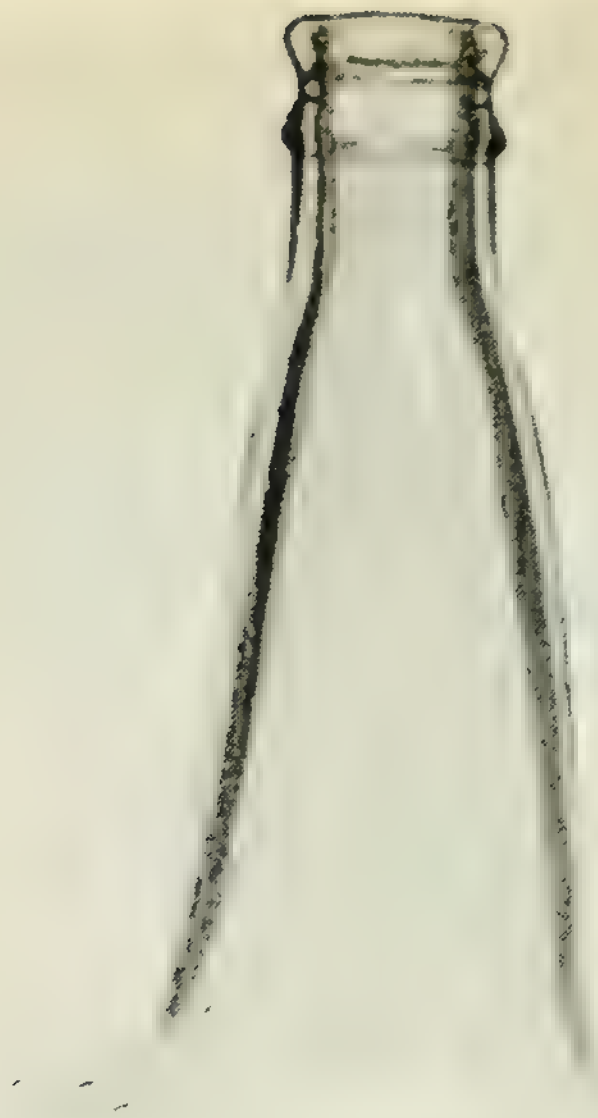
Grooming, which involves trimming and pruning decayed twigs and leaves and removing dried flowers from soil, entails keeping the terrarium scrupulously clean at all times. Accumulated debris is an invitation for fungus and bacteria to invade plants, and once plants are weakened, insects will attack them quickly.

To remove small twigs, use an X-Acto cutting knife (sold at artists' supply stores) or a sufficiently long manicure scissors. Be sure all tools are sterile; run a flame over them or dip them in alcohol. You can also fashion homemade pruning tools by using razor blades fixed to dowel sticks.

Don't be afraid to remove fresh leaves on plants if they make the plant look ungainly. Trim and prune as you would for bonsai plants; you won't hurt the plant. Although you should do this before the plant is in the container, invariably it must be done after the plant is installed because it is difficult to see shapes and forms of plants until they are studied as a group, a total scene.

If you must remove a plant from the bottle, use the pickup tool. Always remember to lift roots first so you can get the plant through the opening without bruising it. Remove rampant plants like *oxalis* before they engulf the entire garden. Don't wait until it's too late. Take them out when you notice them starting to push away other plants.

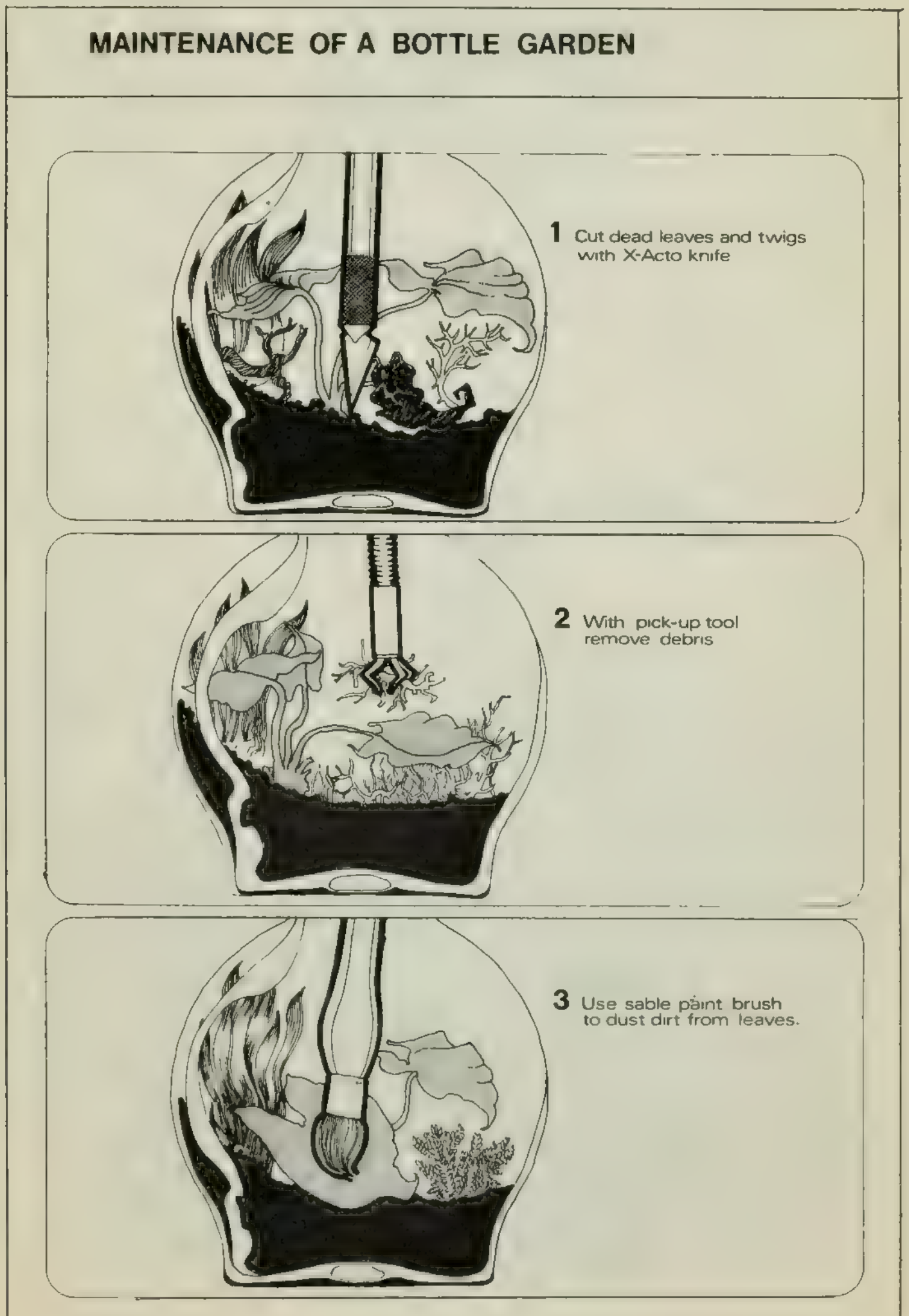
If plants become too large for the garden, remove them and use them as window plants. Replace them with other,



When condensation appears on the inside of the bottle, it indicates plants are getting too much moisture. Leave bottle without stopper and do not water at all for several weeks.

more suitable plants. It's wise not to wait too long to do this either because if a plant becomes too large you may have to tear it apart to remove it from the terrarium.

Frequently leaves become covered with dry or wet soil. Dry soil is easy to remove: use a long-handled artist's sable brush and brush it away. Allow wet soil to dry on leaves before removing it; if you try to wipe wet soil from foliage you may break the leaves (see Drawing 8).


MAINTENANCE OF A BOTTLE GARDEN
1 Cut dead leaves and twigs with X-Acto knife
2 With pick-up tool remove debris
3 Use sable paint brush to dust dirt from leaves.

Drawing 8

This bottle garden needs replanting; plants are too large for it.

PLANT PROTECTION

You'll rarely find insects in bottle gardens, but occasionally some pest may attack plants. Generally, aphids, spider mites, or mealybugs, in that order, are the worst offenders. Aphids are sucking insects that take vital juices from plants. They are usually green or red. Spider mites are impossible to see, but their webs are occasionally visible. Mealybugs look like white cottony masses at leaf axils and under leaves.

There are some old-fashioned household remedies that will eliminate these pests, but several applications are needed. Make a solution of laundry soap and water or use alcohol on a cotton swab. But if these methods are too tedious, and you want to remove the offenders quickly, use a houseplant spray. First, however, check the label carefully to be sure the spray kills the bugs you are fighting.

Don't use poisonous chemicals in the home—there is no need to. Many sprays are natural insecticides; that is, they are derived from plant materials, including *rotenone, pyrethrum, quassia,* and *ryania.* Look for these ingredients on the package, and avoid chemicals such as *lindane, aldrin,* and any hydrocarbon.

If one of your plants becomes infested with insects (a rare occurrence), remove the plant and dispose of it rather than jeopardize other plants in the bottle garden. It really is very difficult to bring a totally infected plant back to health in the confines of the garden.

Insects will be rare in your miniature gardens, but fungus disease, which generally appears as gray mold on plants, may occur more often. This disease, called *botryitis*, can be easily eradicated with applications of fungicide (at nurseries). Charcoal too is a wonderful caution against mold, and as mentioned should be used when planting the bottle gardens.

PLANT CLUES AND CURES

Many times plants may simply not respond in the confines of a bottle. Insects are usually not the problem—it is

There is a good balance between air and moisture in this bottle garden; note how clear glass is.

culture. Plants, like people, give clues if they are unhappy in a situation, so it is wise to heed these clues:

Yellow leaves: Generally caused by overwatering or by insufficient amounts of soil nutrients.

Leaves that drop: Foliage may be touching glass and becoming bruised. Some plants are especially prone to this.

Leggy growth: Not enough light.

Leaf tips brown: Generally caused by overwatering.

Salt deposits on glass: Hard water; let water stand overnight.

Yellow patches on leaves: Icy cold water.

8 BOTTLE LANDSCAPES

It is certainly possible to put a few plants in a glass bottle and have a garden (many people do this), but it is more eye-appealing if the plants are arranged in a specific scene. Then, like the Japanese art of *saikei,* the bottle garden becomes a diminutive scene of something in nature and is totally charming.

Bottle landscapes are challenging and do take some time to create, but a lovely woodland landscape under glass brings immense satisfaction to your soul and is a compliment to your skills. The trick is patience—don't rush and don't blunder. Consider each plant and each stone. Each blade of grass is vitally important to the total picture, and scale and balance must be observed to achieve a handsome scene.

You can duplicate practically any nature scene, but the most popular ones are the woodland, marshland, Japanese, tropical, and desert gardens. Use plants that belong with each place the garden where it will receive bright light in winter end of each section).

WOODLAND GARDENS

If you've ever taken a walk through the woods you know that beauty abounds in a shady moist Eden. Here many diminutive plants pepper the forest floor with color and beauty. Overhead, a crown of trees provides shade in hot summer and in winter, when leaves are gone, filters sunlight through to nurture plants. These woodland conditions can be easily simulated in a bottle garden; lovely ferns, mosses, and other charming plants can be on your windowsill all year. You'll have to purchase most plants from suppliers. Don't pick them in the forest preserves; it's against the law in most states.

Provide a rich humusy soil for the woodland scene, and place the garden where it will receive bright light in winter, and shade in summer. Arrange plants so they appear natural in the setting. Use hills and valleys and perhaps install a tiny meandering path of white gravel. (see Drawing 9). Try the following plants for an intriguing woodland garden:

Acorus gramineus pusillus. A compact grassy plant that is excellent for corners. Lends good vertical accent; grows to 4 inches.

Adiantum bellum (Bermuda maidenhair). Six-inch miniature version of the maidenhair fern.

A. hispidulum. Lovely, with dark green branching fronds.

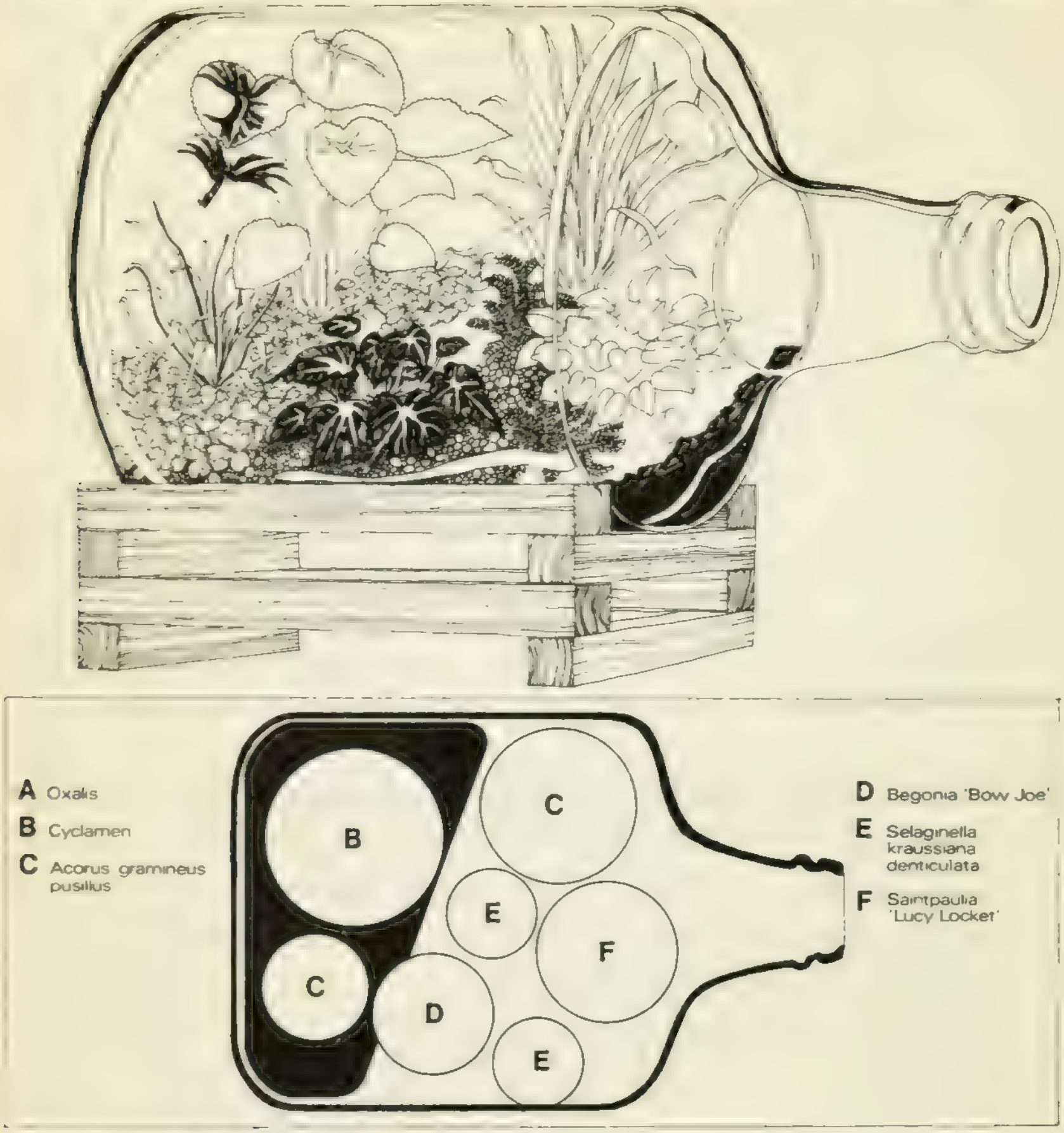
Anoechtochilus roxburghi. Shade-loving orchid, grown for its exquisite velvety green leaves with gold veins.

Arisaema triphyllum (Jack-in-the-pulpit). This native plant needs little introduction; it is a charmer, with green striped spathes flushed with purple. Deciduous and difficult to grow, but will succeed in a large terrarium that is very airy and cool.

Calathea argyraea. Low and compact, with blotched green leaves laced with silver.

Cypripedium. This is a fantastic group of orchids, and their beauty has made them so much the target of every collector that few native stands remain. I would never

WOODLAND BOTTLE GARDEN



Drawing 9

suggest them for ordinary windowsill culture (although they are sold for such purposes), nor have I ever recommended them in my orchid books. However, for terrarium growing there are a few that will succeed, but very few. Don't pick them from the forest. Order from local dealers, and get plants into the terrarium immediately; even a day without attention will kill them.

C. acaule (Pink lady-slipper). Lovely, but it needs a strongly acid soil.

C. parviflorum. This is the orchid you should try because it will succeed in a cool moist terrarium with slightly acid soil. It bears a fragrant yellow flower atop a 12-inch stem (often confused with *C. pubescens,* which is a larger plant that grows to 24 inches).

C. reginae (Showy lady-slipper). Regal orchid that grows to 18 inches, with showy pink blooms. Difficult to grow, but not impossible; needs a shady, moist place with slightly acid soil.

Cyrtomium falcatum (Holly fern). Somewhat large, but so beautiful with its scalloped shiny green leaves.

Dicentra canadensis (Squirrel corn). Small, to 10 inches, with fine white flowers; goes dormant soon after flowering, but worth a try.

Episcia. Fine velvety-leaved plants that bear myriads of colorful flowers. Supposedly prefers warmth, but does quite well in the woodland conditions. Many varieties are available.

Fittonia verschaffeltii (Mosaic plant). Fine terrarium subject, with velvety green leaves laced with veins of contrasting color.

Gaultheria procumbens (Wintergreen). Good evergreen cover that likes moderately acid soil and shade; white flowers and red berries.

Hepatica acutiloba (Sharp-leaved liverleaf). Three-lobed leaves; flowers may be white or pink. Grows in neutral

soil, and probably will be the first in the terrarium to bloom.

Lycopodium (Club moss). Fine plants that simulate oak, maple, and beech trees; lacy and lush green. Try these:

This marshland garden is lush with plants; most are common house plants that like wet feet.

L. clavatum (Running pine). Long fuzzy stems.

L. complanatum (Ground cedar). Trailing stems with fanlike branches to 5 inches long.

L. lucidulum (Shining club moss). Shining scalelike leaves. Because it barely grows more than an inch a year it is perfect for vivariums.

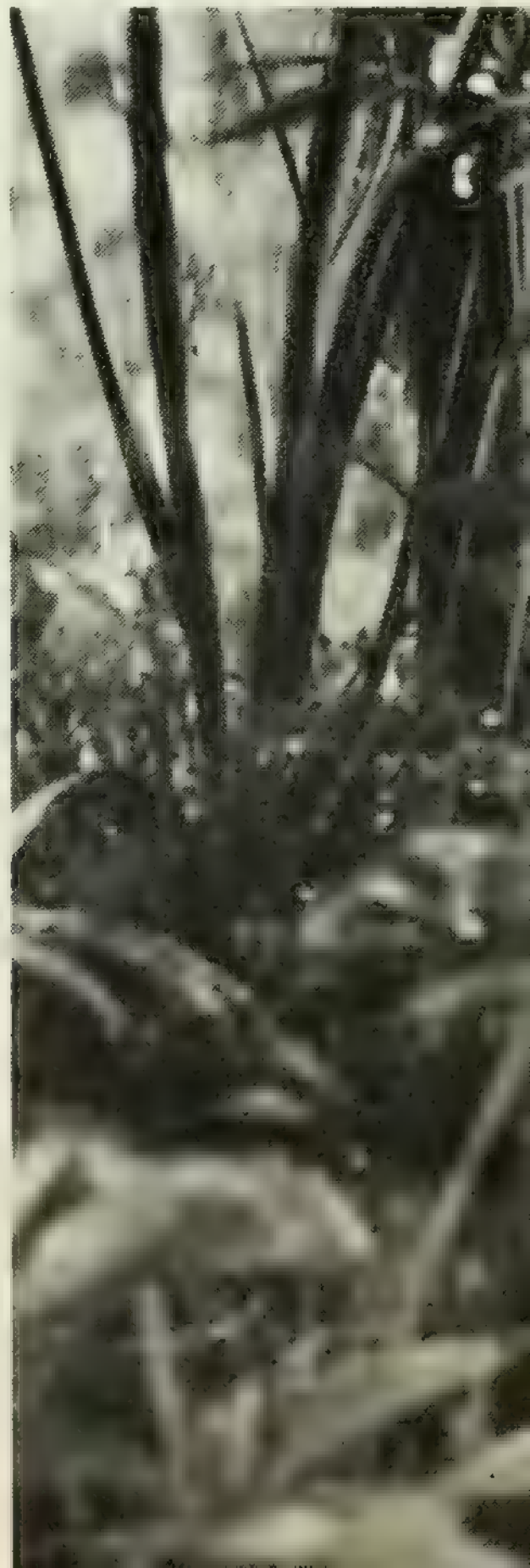
L. obscurum (Ground pine). Looks like a pine. Branches grow to 10 inches, with sessile spikes.

Maranta massangeana (Prayer plant). A kaleidoscope of color: leaves are purple and green. Outstanding.

M. (Ctenanthe) oppenheimiana. Another exotic beauty, with multicolored foliage.

Mitchella repens (Partridge berry). Evergreen creeper that bears red berries at Christmastime and lasts for many weeks. Spreads easily and needs a moderately acid soil; never let it dry out.

Pellaea rotundifolia (Button fern). Decorative plant with dark stems and round green leaves.



Looking into the confines of a tropical garden. In closeup this bottle garden indeed resembles a natural tropical scene.

Polystichum tsus-simense. Dwarf-growing fern with delicate lacy fronds.

Pteris ensiformis (Victoriae). Silver-leafed fern margined with dark green. Many varieties.

Sanguinaria canadensis (Bloodroot). Gray-green plant that likes shade. Has white flowers early in spring.

Selaginella. Often called moss ferns, these are neither moss nor fern but soft club mosses:

S. caulescens. Tall, deep green, and lacy, with upright fronds spinning from the center.

S. denticulata. Listed so you will avoid it. Has widely separated scales, is bright green, and grows rampant.

S. emmeliana. The one frequently offered by nurseries; light green in color and lacy.

S. uncinata. Blue-green leaves, grows in bunches; fine terrarium plant.

Sinningia pusilla (Miniature gloxinia). True gem, with soft round leaves and pale lavender flowers. Likes a little more warmth than offered in woodland conditions, but it is worth a try.

Trilliums. A favorite group of many plants, and what you choose depends on conditions in the vivarium. *T. grandiflorum* bears lovely white flowers with pink hues and grows to 18 inches. It needs a moderately acid soil. *T. undulatum* must have very acid soil, so don't try it unless conditions are just right. Has white flowers with a rosy throat. Tubers of *trilliums* are usually available at suppliers in the fall; plant them at least 2 inches deep in the vivarium.

Mosses. This is a varied group of fascinating wee plants that are delightful nature studies. There are so many different mosses that they would require a book of their own to do them credit. Here are a few I have tried in vivariums: *rhodobryum, mnium, climacium, bryum,* and *timmia.*

Small trees. Almost any seedling forest tree can be used in the woodland garden to supply vertical accent. Try yew, hemlock, and white cedar.

MARSHLAND GARDENS

The marshland or bog garden is a wonderland where marsh marigolds, partridge berries, and skunk cabbages abound. (You can also use *philodendron, syngoniums, zebrina,* and others that don't mind having their feet wet.) It is shady and moist, with high humidity—an awakening garden that offers hours of nature study. The soil must be acid (4 to 5 pH); use decayed pine needles and oak leaves, or condition the soil with special acid fertilizers.

The soil must also be moderately moist, but it should never be muddy. These conditions are not easy to duplicate, so it might take some time before you accomplish this masterpiece of a garden. However, do keep trying. Place the garden in a shady place, and be sure it has coolness (60° F) at night. During the day, 70° F is fine, but try to avoid excessive warmth.

Try these bog plants in your bottle garden:

Adiantum cuneatum gracillimum. Small fern, with delicate lacy fronds.

A. pedatum (American maidenhair). Another good fern, with graceful curved fronds.

Andromeda polifolia. Small leathery leaves and light pink flowers make this a desirable terrarium plant. A dwarf plant that stays low-growing; ideal.

Asplenium platyneuron (Ebony spleenwort). Feathery fronds and brown-purplish stems make this a delightful fern for the tiny garden.

A. trichomanes (Maidenhair spleenwort). Six-inch fern with thick clustered fronds and 1-inch leaflets on black ribs.

Blechnum spicant (Deer fern). Large but handsome fern; dark green glossy fronds.

Caltha palustris (Marsh marigold). Bright yellow buttercup-type flowers dot this spring beauty. Needs its feet in water to thrive.

Chimaphila maculata (Striped *pipsissewa).* Arrow-shaped leaves with lovely veining.

Coptis trifolia. Dainty bog plant, with handsome scalloped leaves.

Cornus canadensis (Bunchberry). This small cousin of the dogwood tree makes an excellent ground cover in shade. Grows only a few inches high.

Dionaea muscipula (Venus flytrap). Curious insect-eating plant; small, with bright green clay foliage. An oddity.

Somewhat Japanese in character this simple but lovely bottle garden houses an azalea and some low ground cover.

Drosera rotundifolia. Unique plant that is fascinating to watch; has tiny round leaves with hairy blades that capture insects.

Dryopteris cristata. Lovely blue-green fern.

D. linnaeana (Oak fern). Dark green and handsome.

Epigaea repens (Trailing arbutus). Bright green leaves; white or pink flowers. Needs a very acid soil to survive.

Goodyera pubescens (Downy rattlesnake plantain). Dainty bog plant with oval green leaves veined white.

Houstonia caerulea (Bluets). No guarantee that this one will succeed, but the dainty yellow-eyed blue or white flowers make this a definite challenge.

Kalmia polifolio (Bog kalmia). Grows to 20 inches; leaves white underneath, and flowers are rose-purple.

Mitchella repens (Partridge berry). Fine evergreen creeper with pinkish-white flowers and red berries.

Polypodium vulgare. Can grow large, but seedlings are fine for habitat; evergreen fronds to 8 inches.

Potentilla fruiticosa. Good shrub with bright yellow flowers; many varieties. Select dwarf kinds.

Sarracenia purpurea (Northern pitcher plant). Green to dark purple pitchers; one of the bizarre insect-eating plants.

Spiranthes cernua (Nodding ladies tresses). Bright little orchid with white flowers on a 12-inch stem. Worth a try.

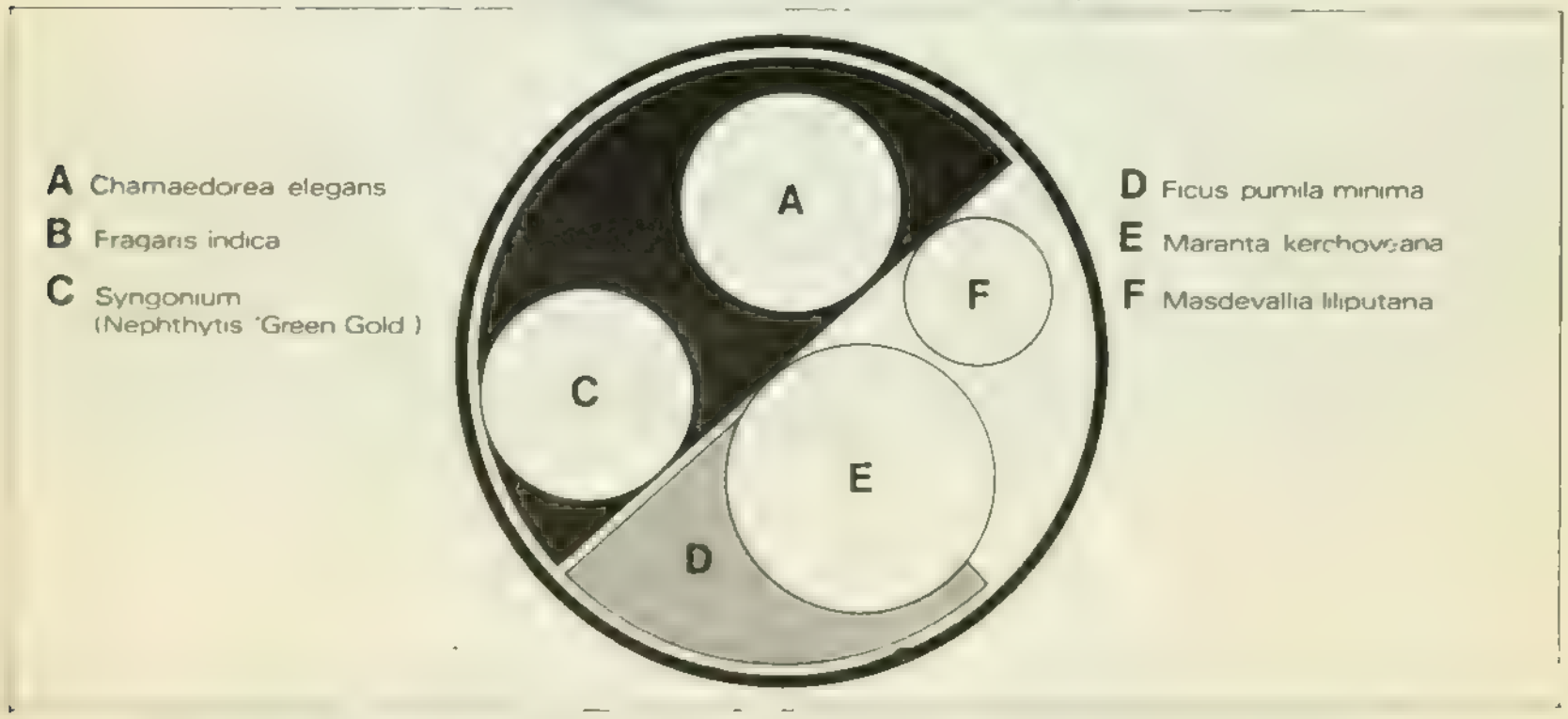
Also try seedlings of arborvitae, spruce, white pine, and yew. Good bog mosses to use are *aulacomnium palustre, climacium dendroides, polytrichum juniperinum,* and *p. strictum.*

TROPICAL GARDENS

This is the garden for many of our fine houseplant; they create a stunning scene. You want a lot of plants here; and colorful African violets, tapestry-leaved begonias, and marantas can dot the landscape. Tuck a wee orchid into a niche; use pteris ferns and mosses (see Drawing 10).

Create canyons with crevices—a flat terrain is dull—and use *peperomias* and other miniature houseplants. Avoid creepers and trailers that will engulf the garden. Provide a rich, 3- to 4-inch soil base; don't forget the gravel and charcoal chips. The tropical bottle garden needs warmth, about 80 to 85°F by day, 75°F at night. If natural bright

TROPICAL BOTTLE GARDEN



Drawing 10

light is not available by day, use some artificial light. An ordinary 60-watt reading lamp over the garden for 14 hours daily will do just fine. Tropical plants that you can try are:

Angraecum compactum. Charming diminutive orchid with large white flowers. Plant in pockets of osmunda fiber.

Anthurium scherzianum. Popular houseplant that grows to

12 inches, with bright red spathe. Loves the conditions of the tropical terrarium.

Ascocentrum miniatum. Orange flowers crown this 5-inch orchid; has a bright color and is quite dependable.

Bulbophyllum barbigerum. Intricate orchid with purple-brown hairs; loves warmth and sun. *B. morphologorum* is another good candidate, with hundreds of minute yellow-brown flowers that form a crown.

Caladium humboldtii (Little rascal). Fine foliage accent, with lance-shaped, wine-red foliage.

Calathea picturatum argentea. Another good accent plant, with silver leaves etched in dark green.

Camptosorus rhyzophyllus. Diminutive charmer, with spade-shaped evergreen fronds.

Chamaeranthemum igneum. Tropical creeper, with velvety bronze-brown leaves and pink veins.

Cirrhopetalum cumingii. Stunning orchid; only 2 inches high, with red and pink flowers in a half-circle design.

Cryptanthus bromeliodes tricolor. Fine *bromeliad;* small with rosettes of green leaves striped pink and white.

Episcia. Spreading plants with velvety leaves in exquisite colors and a bonus of charming flowers. Select from the many small species that are available.

Ficus radicans variegata. Creeper, with silver-green leaves marked white; *F. pumila* is also interesting, with its heart-shaped leaves and disks that cling to glass.

Hedera helix (English ivy). Delightful plant with bright ivy-shaped leaves. Many varieties; choose small-leaved ones.

Helxine soleirolii. (Baby's tears). Charming bright but rampant green ground cover for shady areas. Use with discretion.

Humata tyermannii. Small and delicate, with lacy fronds.

Microlepia setosa. Delicate fern with feathery fronds.

Philodendron. Many of these popular plants can be grown in

This bottle was planted to duplicate a woodland scene.

a tropical garden. Select small-leaved kinds (there are too many to mention). Plant in pockets of osmunda fiber.

Polystichum setiferum (Hedge fern). This fine fern has feathery fronds covered with brown hairlike scales.

Pothos (Scindapsus) aureus. Climber, with ovate green leaves blotched with yellow; grows fast and will need pruning. Plant in pockets of osmunda fiber.

Pteris cretica (Ribbon fern). Charmer, with delicate fronds to 6 inches.

Restrepia elegans. Two-inch lovely orchid that produces a fantastic yellow flower dotted red; must be seen to be believed. Plant in pockets of osmunda fiber.

Saxifraga sarmentosa (Strawberry geranium). Neither a strawberry nor a geranium, but always a favorite, with its round and hairy silver-veined leaves.

Mosses. These incredible, diminutive plants are the finishing touches for bottle gardens. The following ones have proved satisfactory for us: *climacium, mnium, rhodobryum, grimmia,* and *rhagcomitrium.*

For African violets, miniature begonias, ferns, geraniums, and orchids, see chapter 4.

JAPANESE LANDSCAPES

The theme in this type of garden is simplicity. Use only a few graceful plants, and garnish them with colored gravel, stones, and an occasional tiny gnarled branch. The plants for this Japanese picture are houseplants rather than bonsai subjects. Many have graceful lines and lacy foliage that complement the Japanese landscape. Because you want sparse beauty, use grassy plants.

Plant the garden in the same manner as other bottle landscapes; keep it in a cool bright place. Try these plants:

Acorus gramineus pusillus. Tiny grassy plant to about 4 or 5 inches. Set in groups in corner of bottle for best effect.

Bambusa nana. Small bamboo, with feathery leaves and delightful apple-green color.

Begonia dregei. Small, bronze-leaved begonia that has maple-shaped foliage. Delightful in a bottle.

B. foliosa. This ferny-type begonia has tiny leaves and a pendant habit. Very decorative.

Gasteria lilliputana. Short and sturdy, this succulent has dark green leaves mottled with pale green.

Haworthia fasciata. Small rosette of pointed leaves; charming.

Laelia pumila. Distinctive 3-inch orchid with large rose-colored flowers.

Philodendron sodiroi. Has lovely heart-shaped leaves; simple and elegant.

Punica granatum nana. (Pomegrante plant). Tiny apple-green leaves; lovely gnarled growth.

Sedum multiceps. Small, with dark gray-green needlelike leaves. Many other species suitable too.

Tillandsia ionanthe. Tufted dark green miniature bromeliad.

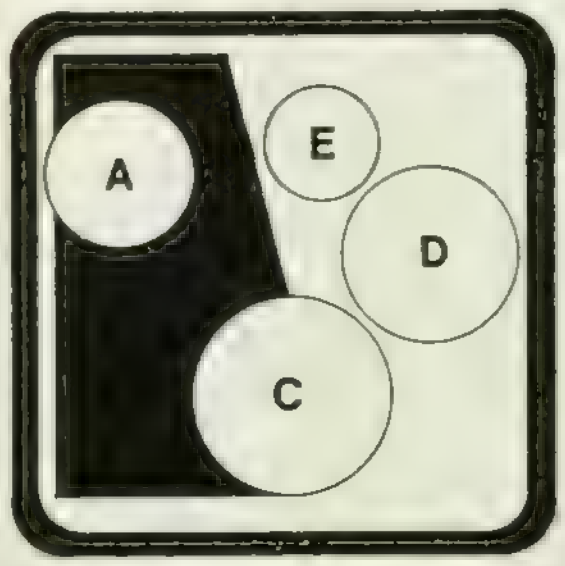
DESERT GARDEN

If the desert scene has always appealed to you, this is an easy garden to assemble in glass. However, with cacti-type plants (generally 1 to 2 inches in diameter) a bottle with a large opening is needed to accommodate the plants. It is best not to cover the desert garden; succulents and cacti are fleshy plants and prone to rot in overmoist conditions.

Use a growing medium that is equal parts of soil and sand. Put gravel and charcoal into the container and then add 3 to 4 inches of soil mix. Use only few plants; sparse planting is the keynote for these gardens (see Drawing 11).

Small orchids and verdant ferns are arranged to create a marshland garden in this bottle.

DESERT BOTTLE GARDEN



A Echevena tolucensis
B Sedum greggi
C Crassula platyphylla
D Mahuena poeppigii
E Pachycereus pringlei

Drawing 11

Keep the soil in the garden on the dry side but never so dry it becomes cakey. As mentioned, allow air to circulate within the container. A bright but not sunny location is best for the desert garden. (Some plants have spines so you will have to handle them with gloves).

Here are some plants for the desert garden:

Adromischus clavifolius. Club-shaped leaves flecked with reddish marks.

Crassula cooperi. Foliage is green and dotted with red. Pretty. *C. platyphylla* is also a good choice. Select small plants.

Echeveria tolucensis. An open rosette of green leaves; about 2 inches in diameter.

Gasteria verucosa. Tapered pink and purple leaves with white warts.

Haworthia limifolia. Small succulent with ribbed leaves.

Rebutia miniscula. A tiny green globe; dark green and with soft spines.

Sedum greggi. Low growing tufted succulent. Excellent.

9 CUTTING BOTTLES – USES FOR CUT BOTTLES

This craft opens new fields for the bottle garden enthusiasts. Once you make a few bottle gardens you might want to try to cut bottles to make domes for your display. Another prospect with cut bottles is to use two bottles to make one. For example, cut one bottle three inches from the bottom. Cut the second jug as close to the bottom as possible. You can plant the first bottle with soil and plants and then merely place the top half of the second jug on top. After sealing the segments with epoxy you'll have a bottle garden without planting through a tight opening. However, this method is like cheating, because anyone will see the cut and realize what you were up to. Still, it can be done.

Cutting bottles is hardly beyond the average person's ability. It does take time, patience, and a few attempts, but eventually almost anyone can do it. Although I still use the old-fashioned glass cutter or file, there are now several types of cutting kits available: tap, hot-wire, and flame cutters. (Their mechanisms are somewhat different, but the cutting method is basically the same.) Make the score on the outside

of the bottle where you want the glass to break, and then apply stress by tapping or by alternating heat and cold.

COMMERCIAL BOTTLE CUTTERS

Bottle-cutting kits (sold at hardware stores) employ a glass-cutting wheel. Dirt causes it to skip when you are cutting the glass, so be sure all bottles are clean and free of labels. Soak bottles in hot water for 10 to 20 minutes to remove labels. Don't use a razor blade to scrape off the paper; it can scratch the glass. Rinse and dry bottles thoroughly.

Tap Cutter

The tap-type cutter employs a jig to hold the cutter in position. Attach the cutter and then rotate the bottle. Use a light but firm pressure. Now remove the cutting device, and

Cutting an apple cider bottle with a commercial bottle cutting kit. Line is scored near bottom.

Tapper is used inside bottle to create break in glass.

insert the tapper into the bottle. Clink it against the inside of the bottle above the score mark you made. Tap gently at first, increasing pressure each time around. Keep tapping, you'll know you're successful when you see the score line start to develop hairline fractures. When the line is completely fractured, the two halves will fall apart.

Hot-Wire Cutter

The hot-wire cutter has a housing with a glass-cutting wheel in place, rails to set the bottom on, and an adjustable sliding backstop. Put the bottle on the rails, and move it down until you have it in position; now tighten the wing nut. Press down on the bottle, against the glass-cutting wheel. Rotate the bottle to make the cut. Once again, don't use force. The trick here is to make the mark on the bottle in one complete turn. Now turn the bottle around to the other side that houses the heating element. Loop the wire around the

score mark. Apply tension so the wire is tight, and then turn on the heating element. When you hear a cracking sound and see the fracture line on the bottle, remove the bottle and gently tap the cut line with a wooden tool to separate the segments.

OLD-FASHIONED METHOD

Mark the cut you want to make with a glass crayon marker. Draw a dark line so you can see it easily. Now run a glass cutter or a file along the line. The standard inexpensive glass cutter (sold at hardware stores) is not difficult to use. Make the cut deftly and quickly and without too much pressure (you might want to make a hand-built jig to hold the bottle in place). The amount of pressure between the glass and the cutter is the trick of bottle cutting. There should be a

The top half of the cut bottle is perfect for a dome bottle garden.

A completed dome bottle garden; the featured plant is a diminutive ivy.

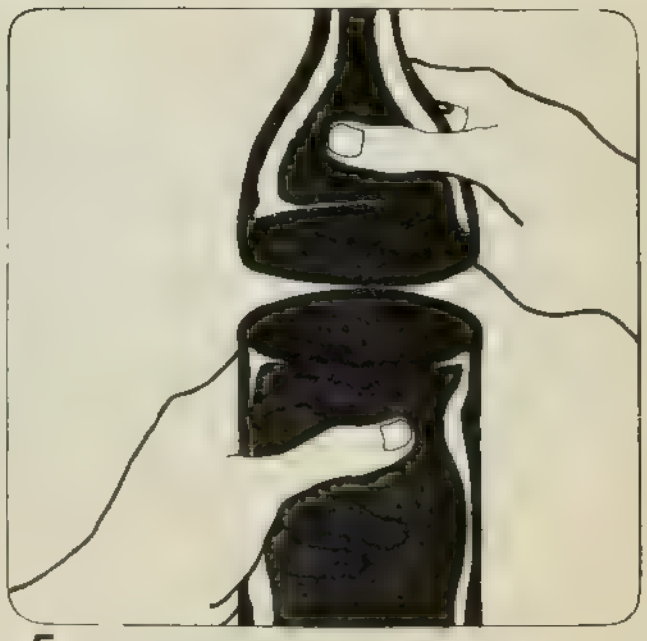
CUTTING BOTTLES

1 Make cut with commercial glass bottle cutter.

2 Soak string in lighter fluid and tie around scored cut

3 Light string

4 Immerse in water.



5 Hold bottle firmly and break

Drawing 12

soft ripping sound, with no skips or bumps. If the cut is white or throws chips, you are pressing too hard.

Once the cut is made, soak a string or cord in lighter fluid, tie it around the cut, and then ignite the string. When the flame dies, plunge the bottle neck down into a bucket of cold water. Smooth the cut edges with a carborundum stone or with #60 emery paper (see Drawing 12).

Remember that this is a tricky business whether you use

the bottle kits or cut your own bottle with a glass cutter. Jagged broken glass cuts deeply and sharply if your hand gets in the way. Be careful, use heavy gloves, and handle all glass with respect. Don't cut very heavy glass bottles because it is just too difficult and may take several attempts. Even with thinner glass you may not be successful the first or econd time. Experience is the best teacher when cutting bottles.

DOME GARDENS

You can use either the top or bottom of a cut bottle and insert it over a dish for a dome garden. Any type of large bottle is suitable, but the diameter of the cut piece must match the diameter of the container you choose. Any bowl, dish, or pan that will hold 2 to 3 inches of soil will do fine. Glass domes for covering stuffed birds and memorabilia are also available from manufactures, but they are hard to find, of only one basic shape, and expensive; it's much more fun to cut your own, and then you have a selection of shapes and sizes.

A bottle-dome garden works on the same principles as a bottle garden. Tiny plants become a fascinating greenery in it, and moisture and humidity is provided as it is in bottle gardens. Plant the garden in the same manner as for bottles: a layer of gravel, some charcoal, and 3 to 4 inches of rich soil. Plants are the same too (see chapters 4 and 5).

10 BOTTLE BOUQUETS

Fresh green plants in bottles are certainly handsome, but there is also a wealth of beauty in dried plant materials under glass. They become radiant with reflected color and last indefinitely, making fine seasonal displays. Grasses and seed pods, husks and seed heads, dwarf flowers such as marigolds and zinnias, rose haws, and berries are all nature's materials for the dried arrangement under glass. Lovely autumnal scenes and dramatic winter landscapes can be created for viewing pleasure.

Most dried materials are not flexible, so the bottle dome with dish (as explained in chapter 9) is best, or, if you like a challenge, use bottles with at least 2- to 3-inch openings.

SUITABLE PLANTS

Walk through your garden to find suitable dome garden plants, or use wild plants such as barberry, cattail, dock, and milkweed from roadsides. With some you'll want the flowers; with others you'll want buds or pods. In any case, the idea is to seek the unusual—you want nature's best example of

Dried plant materials for bottle gardening include cat-tails, wheat, teasle, baby's breath.

designs (and she is a master designer). There are hundreds of beautiful pods and seed heads, flowers, etc. that you can preserve for years under glass. Some will have already naturally dried out, but for most you'll have to dry them.

DRYING

Drying plants is simple. Tie the plants together at the stem ends in small bundles, fastening with string or elastic band. Then suspend the bundles upside down in a dry shady place (a cellar, garage, or closet is an excellent location). Space the bundles on string or coat hangers, and allow enough space between them so air can circulate around the plant material. In about 2 to 3 weeks the plants will be dry and feel crisp to the touch.

Another way to dry plants is to use any commercial drying preparation or silica gel (available at craft shops). I prefer silica gel because it is so easy to use. Fill a cardboard box, coffee can, or cake pan with 2 inches of the gel. Place plant material. In about 2 to 3 weeks the plants will be dry Insert flowers face up. Now simply sprinkle the gel around

each flower, stem, twig, or pod. When the material is completely covered, put a lid on the container and seal it with tape. The length of the drying period depends on the type of plant material used; generally it takes 2 to 10 days. Check occasionally to see if plants feel crisp. If left too long, flowers and such can become too crisp and shatter when handled.

If you can't use dried materials immediately, store them in sealed dry containers. Handle with care.

Tools and Materials

As discussed in chapter 9, the base or the container for the bottle dome garden must be the same circumference as the bottle and at least 3 to 4 inches deep (almost any type of pottery or bowl will do fine). You'll also need floral clay,

Moss is inserted in shallow dish and used as a base for the dried arrangement.

Dried plants are set into moss; the arrangement is low at the sides and high in the center.

some fine gravel, needle holders, wire, and some rubber cement.

Place 1 or 2 inches of floral clay in the bottom of the container. Spread it, and mold it into place with your fingers. The actual arrangement of the bouquet is next. Take your time and try several arrangements before deciding on the final one. To anchor the plant stems in the clay, first make small holes with a thin wire; this saves breaking stems and tempers. When the design is finished, cover the floral clay with gravel chips or aquarium gravel now available in several colors. Set the top of the bottle on the base and seal the joint with epoxy. You can use styrofoam chunks camouflaged with gravel in place of floral clay.

If you are planting directly into a bottle, pour in a sand base, then insert stems into the sand. As mentioned, handle plants carefully to avoid damaging them.

Garden Flowers for Drying

Achillea. Dense, flat heads of yellow or rose-colored flowers.

Artemesia. Flowers mostly insignificant; silvery-white foliage of some is good for accent.

Aster. Various shades of rose, lavender, and white. Use small-flower varieties.

Celosia. Flowers usually golden or vivid shade of red.

Echinops. Round steel-blue heads. Gather before flowers open.

Hollyhock. For drying, pink and rose shades are best.

Poppy. Flowers shatter quickly; however, seed pods are excellent in arrangements.

Rose. All roses dry well except single forms and those with white or dark-red flowers.

Salvia. The blue-flowered varieties are best.

Strawflower. Flowers in a variety of colors; some with yellow centers.

Verbena. Many shades of pink, red, lavender, and white.

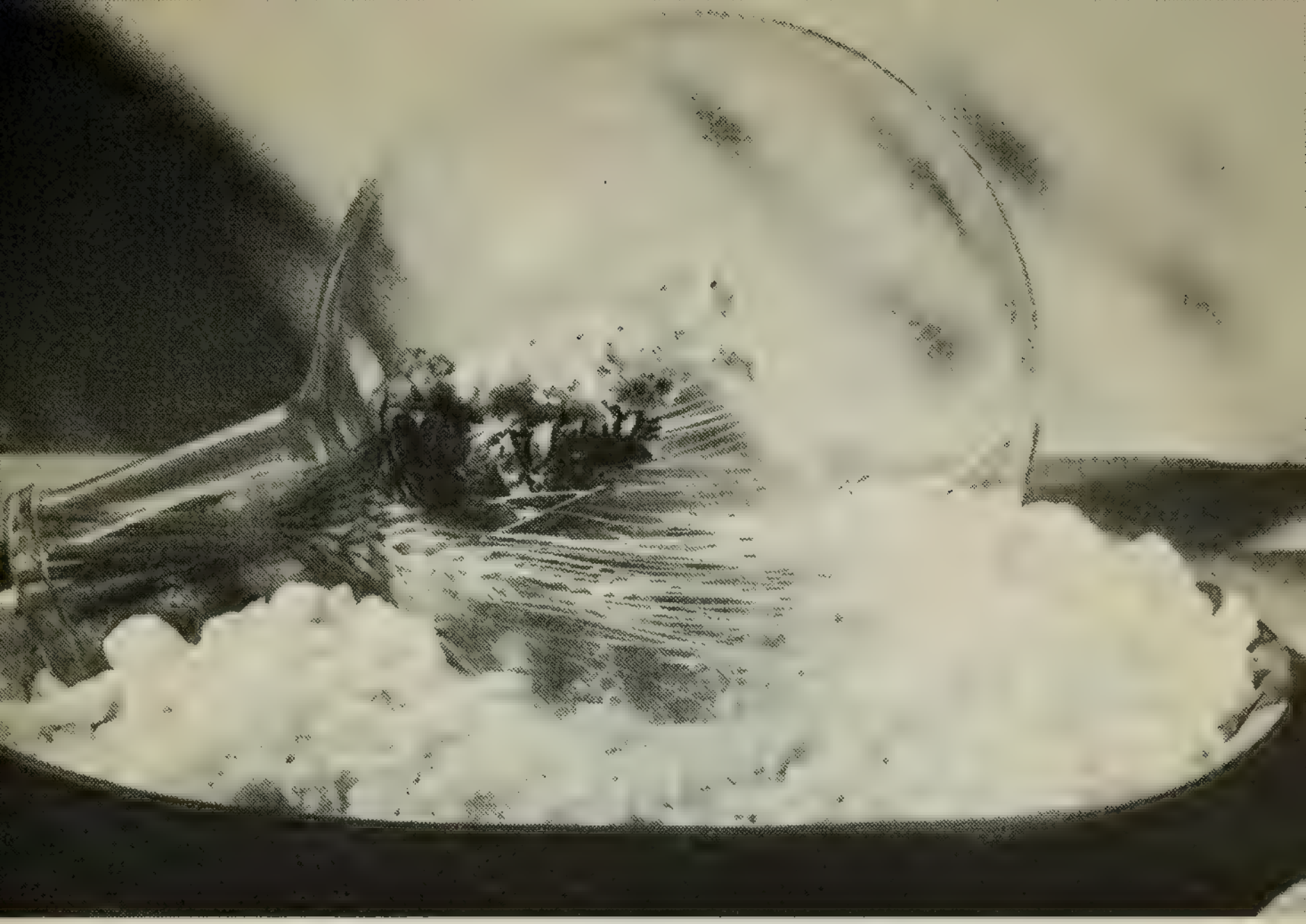
Finishing touches being applied to the dried arrangement.

The dried arrangement under a cut bottle dome.

WILD PLANTS

At the right season, particularly in fall, nature has already done the drying for you, so wild grasses, seed pods, and pine cones are yours for the taking. Also look for oddly shaped roots and gnarled branches. Here are the best wild plants:

Alder
Bayberry
Beebalm
Beech
Burdock
Butterfly week
Cattail
Dock
Ferns
Field peppergrass
Joe-pye weed
Mullien
Queen Anne's lace
Sea lavender
Smartweed
Tansy
Teasle
Yarrow



This dried arrangement is made in a chemists flask set on a bed of gravel in a bonsai dish.

MAKING THE ARRANGEMENTS

The size of the bottle dictates the type of arrangement, but basically there are some general hints to help you get started. Experience and your eye will be the final dictates.

Put tall plant material like grasses and reeds in the container first; this can be in the rear if the arrangement is placed against a wall or in the center if it is to be seen from all sides. Use the tallest stalk to establish a guide for the rest of the plants. The arrangement should be about one and a half times the height of the bottle. The vertical line may be either in the center or off center. Heavy or dark-colored material should be at the bottom or center of the arrangement, with lighter and airier materials around the edges.

Match color carefully or you'll have a spotty appearance. Reds and lavenders, browns and beiges are harmonious, as are yellows and reds, oranges and pinks. Or use a

An old fashioned canning bottle is home for this lovely dried arrangement with teasle and cat-tails and dried eucalyptus leaves.

monochromatic color scheme—different shades of one color—for an appealing effect. Group small flowers together in artful bunches, and use balance and scale throughout the arrangement. Vary the arrangement with small, medium, and large flowers, but never use large flowers next to very small ones.

Creating the dried arrangement is much the same as planting the living garden (chapter 6). But also pay close attention to the shapes of flowers—some are round; others

Cat-tails and baby's breath are the dried materials for this handsome scene in a syrup bottle.

are star shaped; and still others are cone shaped. Star-shaped flowers will clash with cone-shaped blooms but will be harmonious with round flowers. Cone-shaped blossoms are best when used with tall spires of grasses and weeds.

Many people ask me about dried flowers and want to know if they are real. They certainly are; however, there are also some artificial flowers that I try to avoid, not because I am an absolute purist, but because the artificial blooms look plastic and can wreak havoc in a really handsome arrangement. Generally, the artificial blooms are called straw flowers and come in bright garish colors. Use them—if at all—with discretion.

11 SPECIAL BOTTLE GARDENS

Want something different with great appeal? Try growing water plants in bottles. Submerged in water, plants become reflected tapestries of color and form. And, too, water gardens in bottles open the door to the fascinating world of aquatic plants. However, you can also use ordinary house plants like philodendron, Chinese evergreen, and chlorophytum seedlings for waterscapes. With some sand and gravel added these bottle gardens always provoke comments from guests. But make no mistake; they aren't aquariums and won't be suitable for tropical fish. Use them for what they are: an effective decorative piece.

True aquatics like vallisneria and cryptocoryne are popular for water gardens, but Madagascar lace plants are often used too because they are incredibly beautiful.

WATER BOTTLE CARE

To plant your water garden, spread sand several inches deep on the bottom of a tall, tapered bottle. Many water plants have long and tapered grassylike leaves and so need

height. Tilt the bottle to make the sand slope at one end; this provides an interesting terrain. Put in small stones (size depends on bottle opening), and push them into position with dowel. Select interesting stones like small Japanese cobbles, which come in brown, black, or white. Add some charcoal chips to keep the water sweet. Next, make a cardboard funnel, and gently pour water into the bottle, almost to the top. Now set the plants in place with appropriate tools. Be sure they are firmly placed in the growing medium, but don't smother them because most water plants require shallow planting to thrive. Remember that most species are tropical in origin, so keep water at 75 to 85°F. (A small aquarium thermometer helps determine water temperature.)

Place the water garden where there is some sun; water plants do need good light. If algae forms within the bottle, scrape it off the glass with a wooden tool. Trim and remove fast-growing plants as necessary, and add water to compensate for evaporation (allow water to stand overnight before adding to the garden).

The world of water plants is large, and here we suggest only a few of the many water plants available:

Aponogeton fenestralis (Madagascar lace plant). Striking water plant, with lacy leaves that shimmer and shine in water.

A. crispus. Narrower leaves than the above, but still lacy and handsome.

Barclaya longifolia. Highly decorative plant, with colorful pale green and reddish leaves. Needs tall bottle; can grow to 18 inches.

Cabomba aquatica. Circular bouquets of grassy foliage.

Ceratopteris thalictroides. Lovely water fern; pale green stalked leaves.

A canning bottle holds *chlorophytum* and a *philodendron* to make a small water garden.

Cryptocoryne. Many species for bottle water gardens. Some have large leaves, but others are narrow. Whichever you select, plant them in groups.

Echinodorus cordifolius. Handsome heart-shaped leaves; bright green.

E. brevipedicellatus. Pale green, delicately veined foliage; to 12 inches.

Sagittaria subulata (Arrowhead). Popular water plant with arrow-shaped leaves; graceful and attractive.

Vallisneria spiralis (Eel grass). Grassy and twisted; pale to dark green leaves. Easy to grow.

BLOSSOM GARDENS

The uses for bottles and plants is never-ending; for example, forcing small budded branches is a method for adventurous gardeners. These are temporary gardens, but they bring so much enjoyment in the gray winter and rainy early spring days that they are well-worth the few minutes of time they require to set up. Buy cuttings or take them at appropriate times of the year (depending on your part of the country), and then set them into a growing medium—use sand or sand and soil. In a few weeks, bright colorful blossoms unfold into beautiful flowers long before the outdoors shows any sign of color. Thus, no tricks and no secrets are involved in this type of gardening.

Forsythia and pussywillow, flowering crab-apple and pear, dogwood and cherry, flowering quince and lilac are all excellent candidates for blossom gardens. Put them in your regular bottle gardens and remove them when bloom is over. Select a somewhat large bottle (10-inches is ideal), and don't forget to put the lid or stopper in place.

This lovely glass cannister is used as a water garden; the plant is *chlorophytum.*

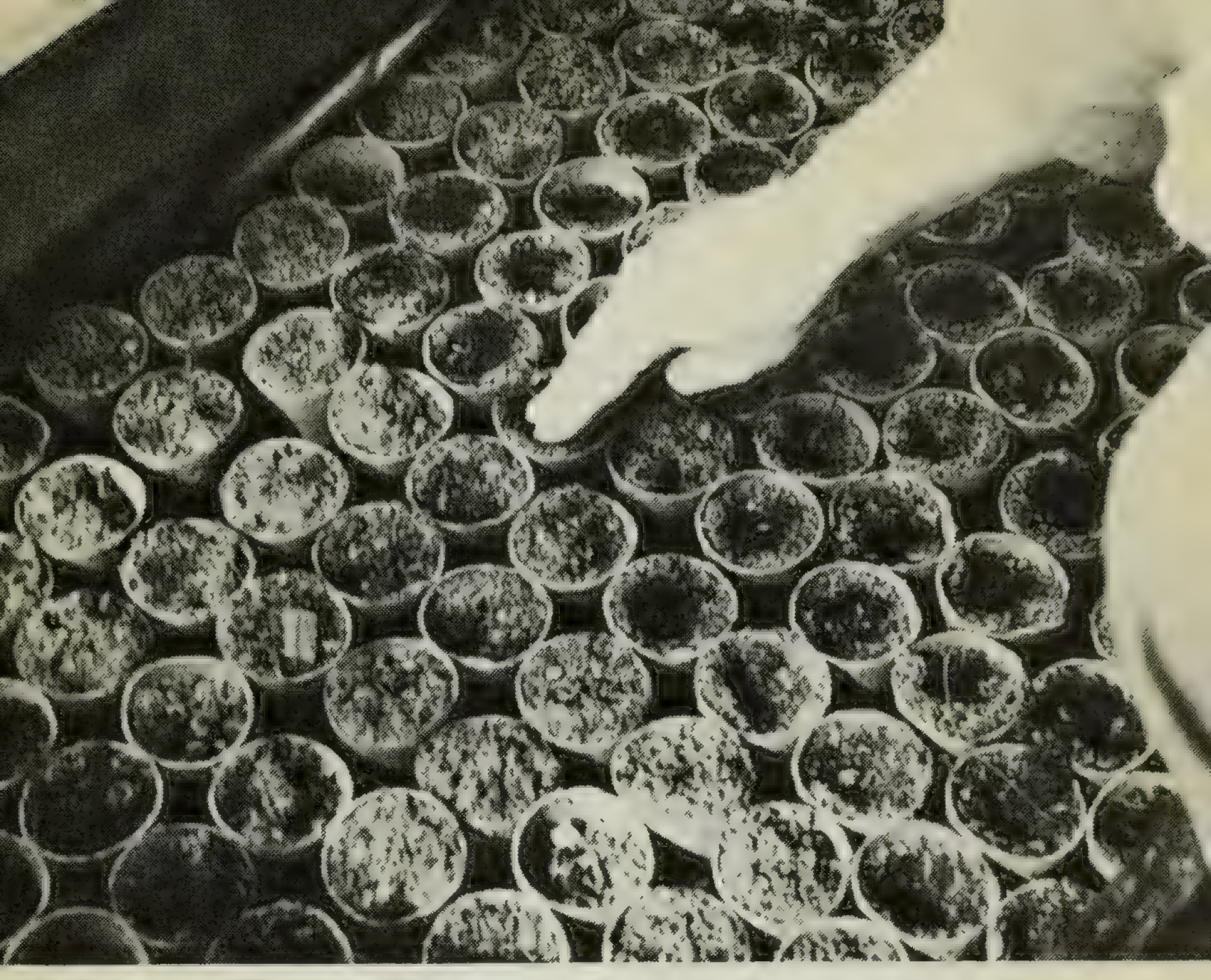
12 WHERE TO GET PLANTS

Today there are dozens of mail-order plant suppliers. Some specialize in African violets, others in geraniums, and so forth (see list at end of book). You can also find plants at local nurseries, florists, or the houseplant sections of any department store. As mentioned in chapter 4, if you are looking for speciality plants such as mosses, ferns, geraniums and orchids, you'll have to order them from mail-order suppliers.

You might also want to grow your own plants; this sounds difficult but is really quite simple. And, of course, it saves money. Another advantage of your own plants is that there is immense satisfaction in starting your own plants for bottle gardens and seeing them grow to perfection.

MAIL-ORDER SUPPLIERS

These companies are located throughout the United States and offer an array of fine miniature plants. I have dealt with many through the years, and although it does take time to secure plants, they always arrive, and in good condition. It

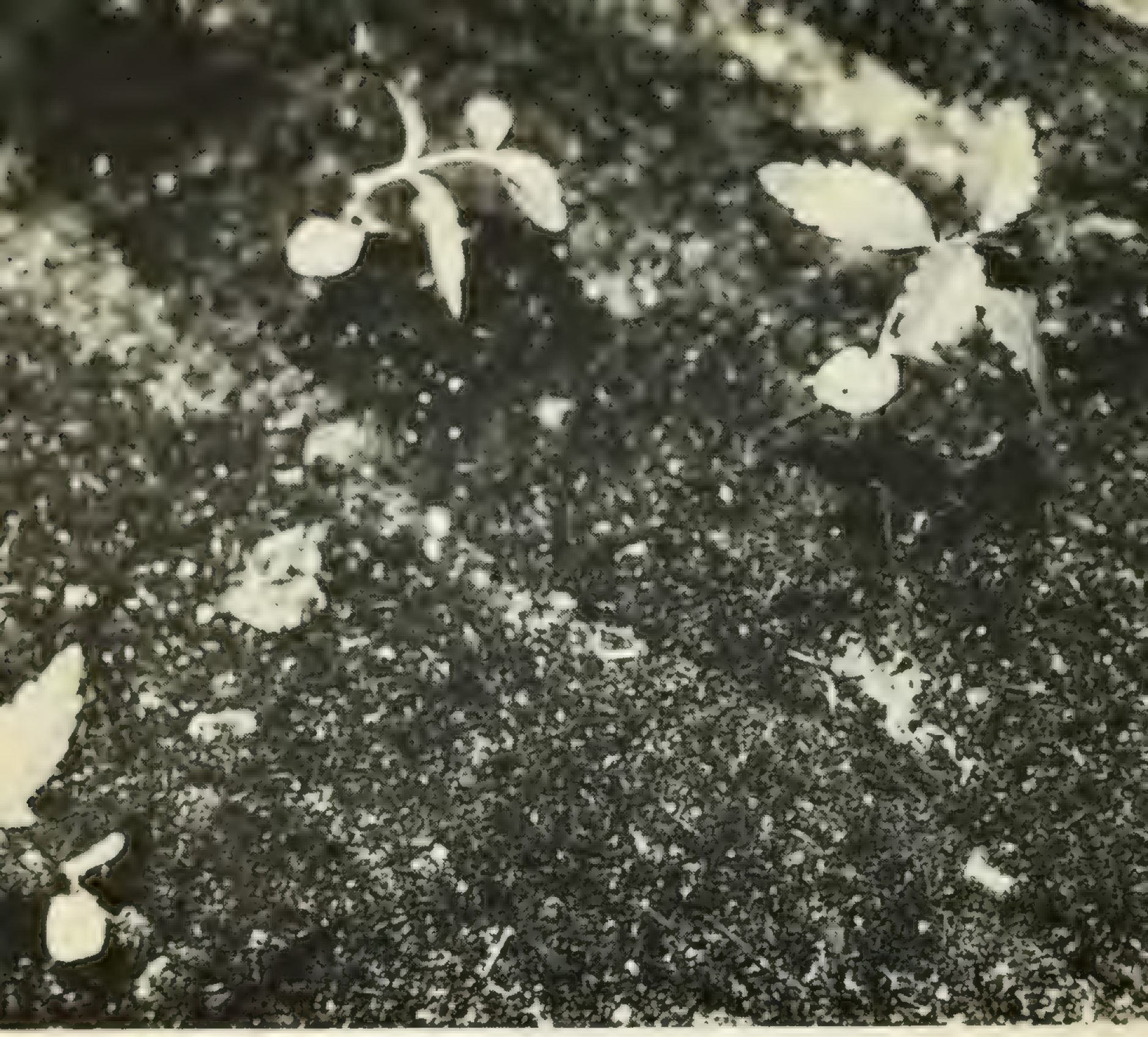


Seeds can be started in peat pots for new plants.

is quite important that you treat the plants properly when you get them so they can adjust to the shock of new conditions.

Order all plants by airmail, even if it costs a little more. Ask that plants be shipped in their original containers rather than having them uprooted because if they are shipped bare root they will take longer to regain their strength. When you receive plants, inspect them to be sure they are free of insects. An easy way to discern otherwise unseeable pests is to soak the pots to the rim in a sink of water for about an hour. If there are unwelcome guests in the soil they will come to the top, and you can then take measures to eliminate them.

Do not immediately replant your new plants into bottles. Allow them to grow a few days in their original soil and containers. Place them in a bright, somewhat cool place

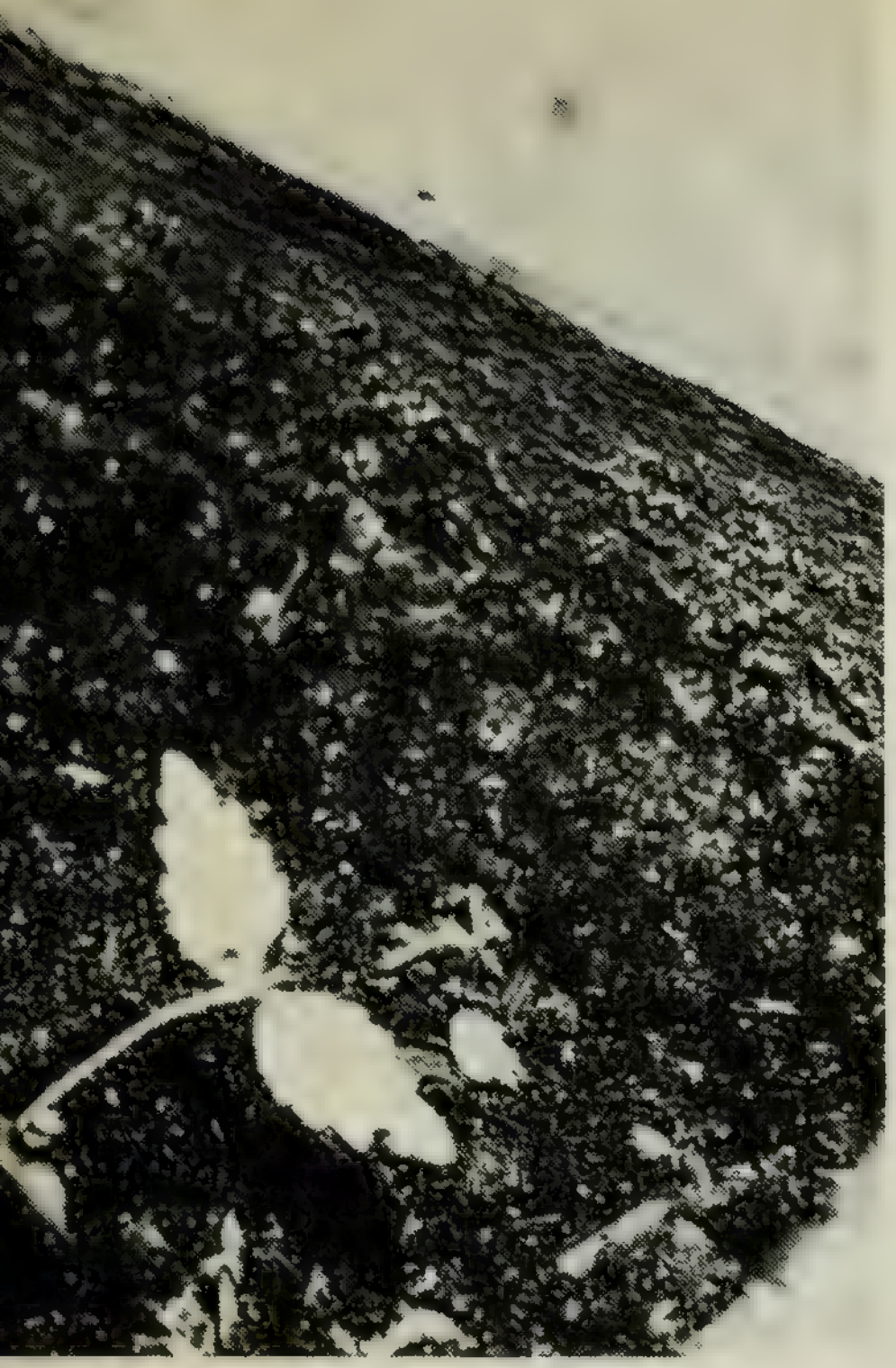


and keep soil evenly moist. Once they have regained their strength, remove them from their pots for planting in the bottle garden.

If possible, order your plants in spring and fall. Summer heat kills plants quicker than cold, and in winter the extremely cold weather is hazardous and may harm plants.

FLORIST SHOPS AND NURSERIES

Quite frankly, you'll find only houseplants here and not a large selection in most cases. If possible, select plants in 2- or 3-inch pots; they are small and are ready to be planted in a terrarium. Avoid buying larger plants because they are usually expensive and must be separated into smaller plants.



Seedlings showing growth, almost ready for individual pots and then for growing in bottle gardens.

If you are looking for specific plants, do ask your nurseryman or shop owner. Many times they know local sources.

GROW YOUR OWN

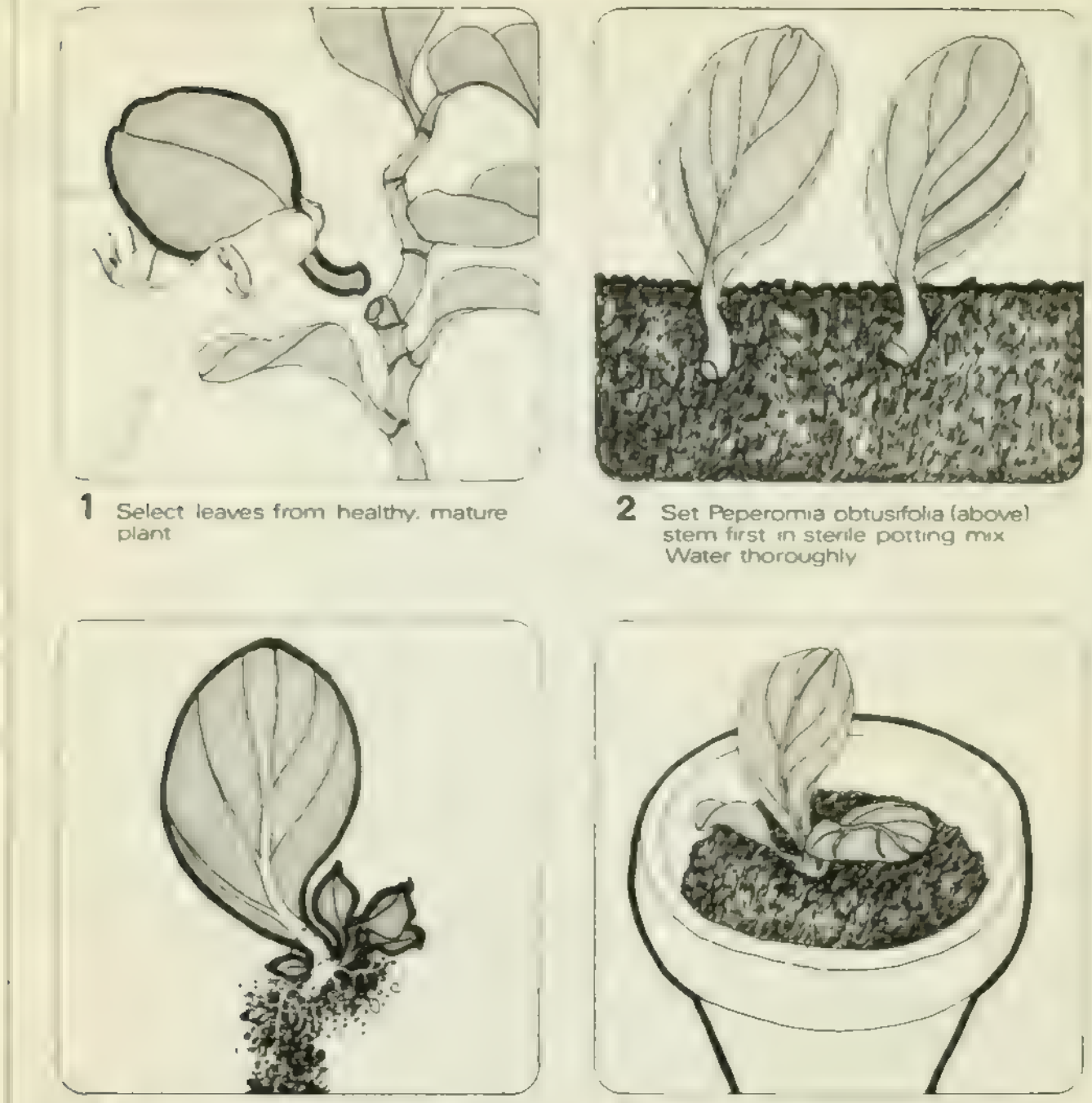
Houseplants are generally the plants you'll want to grow from seed. There are dozens of containers for starting seeds. Some you can buy, while others are household items. Suppliers carry starting kits, and just what you use depends on your own discretion. Household items like coffee cans and aluminum pans that frozen rolls come in are good containers, as are standard clay pots (ask for the azalea type, which is squatty and very suitable for seed sowing). Be sure that any

Here, a stolon is being taken from a mature plant. The new plant can be put into a bottle garden.

household container is at least 3 to 4 inches deep and has some drainage holes for excess water.

Seeds need a suitable growing medium: peat, vermiculite, sand, perlite, or packaged seed-starter mediums. Any medium should be firm, dense, and sterile. To prepare small containers, fill them within a half inch from the top with a sterile moist mix. Press the material into place to eliminate air gaps. Sow seeds about ½ inch apart, and cover large and medium seeds with a layer of dry mix (twice the thickness of the seed is the general procedure). Merely scatter other fine-type seeds on the top of the growing medium. Sprinkle

A cutting with roots ready for planting in a small garden.


STARTING PLANTS FROM LEAVES
1 Select leaves from healthy, mature plant
2 Set Peperomia obtusifolia (above) stem first in sterile potting mix Water thoroughly
3 When leaves appear with roots, remove from container for potting
4 Pot new plants in porous soil

Drawing 13

the surface with water, and then make a tent out of a plastic Baggie: put it on sticks, punch a few air holes in it, and cover the container. Place the planted containers in a bright (but no sun) area that has temperatures of 65 to 75°F by day. At night a drop of 10° is fine. Keep the seed bed moist but never wet, and when germination occurs (you see tiny leaves), remove the plastic so plants can have more air. Move the container and plants to a brighter but not sunny window.

Check the growing medium daily to be sure it is moist; it must *never* dry out. When the second set of leaves emerge, move containers to a bright place. When seedlings are about 1 inch high and have separate leaves, transplant them to pots

STARTING PLANTS FROM CUTTINGS

1 Choose fresh, robust stems for cuttings. Use sharp knife

2 Trim bottom leaves

3 Dip ends into root hormone powder.

4 Set cuttings in flats of sterile potting mix, then water

Drawing 14

with regular soil. (Lift out seedlings carefully with a blunt-nosed tool, capturing as much of the rootball as possible). Feed lightly with a 10-10-5 fertilizer. In a few more weeks, the new plants can be placed in the glass garden.

You can also take cuttings from house plants to get new plants for your miniature gardens. Take strong stem cuttings from mature plants; sever them with a sterile sharp knife. (Run a match over the knife blade to sterilize it). Trim off bottom leaves and dip in hormone powder. Then set cuttings in sterile potting mix (such as perlite or vermiculite) in clay pots or in aluminum baking tins or suitable containers. Water lightly and provide warmth and humidity. When seedlings

CROWN DIVISION
1 A crowded Calathea is ready for division
2 Remove plant by carefully tapping pot on edge of table to loosen soil. Hold plant and gently pull out
3 Separate by cutting or pulling crowns apart. Include roots with each division
4 Repot in porous soil mix Water copiously

Drawing 15

show true leaves, the plants can be removed and used in bottle gardens (see Drawing 13).

Still another way to get new plants is to take leaves from house plants. (see Drawing 14). (African violets are a good example). Place the severed leaves in a sterile potting mix and water them. Provide humidity and warmth. A Baggie or similar plastic material over the propagating box will help provide humidity. When leaves appear, new plants can be placed in your glass garden.

You can also use the process of division to get new plants. Division is merely separating mature plants that have several crowns. Run a sterile knife through the crowns and pot each division separately (see Drawing 15).

The above propagation methods will get you started with many house plants, but ferns require different procedures because plants develop from spores rather than from seed. (A spore looks like a minute speck on the back of the fern frond). When spores are dry, tap them off onto a sheet of paper. Sow them on milled sphagnum moss in a propagating box or appropriate container. Keep them moist and cover containers with plastic or glass. A humid atmosphere is necessary for spores to germinate. The first green growth is called *prothallis,* from which the true ferns will grow. Wait until you see true fern leaves develop from the *prothallis;* then remove plastic or glass covering and replant in individual pots. Ferns germinate best at warm temperatures (minimum 75° F).

WHERE TO BUY PLANTS

Mail Order Sources

Alberts & Merkel Bros. Inc. Box 537 Boynton Beach, Fla. 33435	Orchids and bromeliads Catalog charge
Allgrove, Arthur E. 279 Woburn Street N. Wilmington, Mass 01888	Native plants, carnivorous species Catalog charge
Beahm Gardens 2686 Pamoa Street Pasadena, Calif. 91107	Cacti and succulents Catalog free
Buell's Greenhouses Eastford, Conn. 06242	Miniature African violets Catalog charge
Burgess Seed & Plant Co. 67 E. Battle Creek Street Galesburg, Mich. 49053	Seeds, plants, carnivorous species Catalog free
Burt's Nursery P. O. Box 776 Jupiter, Fla. 33458	Bromeliads, tropical plants

Cook's Geranium Nursery 712 N. Grand Lyons, Kansas	Miniature geraniums Catalog charge
Craven's Greenhouses 4732 W. Tennessee Denver, Colorado 80219	Miniature African violets
Fischer's Greenhouses Dept. HC Linwood, N.J. 08221	Miniature African violets gesneriads Catalog charge
Hauserman's Orchids Box 363 Elmhurst, Ill. 60128	Miniature orchids Catalog free
Ilgenfritz, Margaret, Orchids Monroe, Mich. 48161	Miniature orchids Catalog charge
Johnson Cactus Gardens Paramount, Calif. 90723	Cacti and succulents Catalog charge
Kartuz Greenhouses 92 Chestnut Street Wilmington, Mass. 01887	Miniature begonias, African violets Catalog charge
Leslie's Wildflower Nursery 30 Summer Street Methuen, Mass. 01884	Wildflowers
Logee's Greenhouses 55 North Street Danielson, Conn. 06239	Miniature begonias, geraniun Catalog charge
Lyon, Lyndon 14 Mutchler Street Dolgeville, N.Y. 13329	Miniature African violets List free
Merry Gardens Camden, Maine	Tropical plants Catalog charge
Oakhurst Gardens Box 444 Arcadia, Calif. 91008	Miniature orchids and bromeliads Catalog charge

Park, George W., Co. Greenwood, S.C. 29647	Seeds, plants Catalog free
Robin, Clyde P. O. Box 2091 Castro Valley, Calif. 94546	Wildflowers Catalog charge
Tinari Greenhouses 2325 Valley Road Huntingdon Valley, Pa. 19006	Miniature African violets, gesneriads Catalog free
Tropical Paradise Greenhouses 8825 W. 79th Street Overland Park, Kansas 66204	Tropical plants Catalog charge
Wilson Bros. Roachdale, Ind. 46172	Miniature geraniums Catalog free

WHERE TO BUY GLASS BOTTLES

Allgrove, Arthur E. 270 Woburn Street N. Wilmington, Mass. 01887	
*Owens-Illinois Glass Co. Toledo, Ohio 43601	Products available at florist shops.
*A. L. Randall Co. 1325 Randolph Chicago, Illinois	Glass bottles, etc. available at florist shops.
*West Virginia Glass Specialty Co. Weston, W. Virginia 26452	Glass containers available at florist shop.

Most large department stores now have glass bottles and containers; look for them in their gift departments or in kitchen supplies.
Many specialty shops also have glass bottles for terrariums for sale. Some of these throughout the country issue catalogs at seasonal times.

***Wholesale only.**

BOOKS TO READ

Ashberry, Anne. *Bottle Gardens & Fern Cases.* London: Hodder & Stoughton, 1964.

Brilmayer, Bernice. *All about Miniature Plants & Gardens.* Garden City, New York: Doubleday & Co., 1963.

Drinker Ballard, Ernesta. *Garden in Your House.* Rev. ed. New York: Harper & Row, 1971.

Free, Montague. *All About House Plants.* Garden City, New York: Doubleday & Co., 1946.

Kramer, Jack. *Gardens Under Glass.* New York: Simon & Schuster, 1968.

Kramer, Jack. *Growing Orchids at Your Windows.* New York: Hawthorn Publishers, 1972.

Pinney, Margaret E. *The Miniature Rose Book.* New York: D. Van Nostrand Co., 1964.

Van Ness, Martha. *Cacti & Succulents, Indoors & Out.* New York: Van Nostrand Reinhold, 1971.

Van Pelt Wilson, Helen. *The Joy of Geraniums.* New York: William Morrow & Co., 1971 (pbk).

PAMPHLETS AND PERIODICALS

Audubon Nature Bulletin. Series 4, No. 1, "The Terrarium."

Audubon Nature Bulletin. Series 16, No. 8, "Adventures with Wild Plants, Indoors & Out."

Brooklyn Botanic Gardens. Plants & Gardens Series. Autumn, 1968, "Miniature Gardens."

JOIN THE CRAFTS CRAZE

Everyone's into needlepoint and crocheting, but have you tried rug-making, decoupage, and candles? Lancer Larchmont craft books make any hobby easy, successful, and fun. Try something new—every book features a list of suppliers, so there's never a problem starting or finishing a project. Fully illustrated with photos and diagrams.

___ **28-002 MADEMOISELLE'S YOU MAKE IT!** **$2.95**
by the Editors of Mademoiselle Magazine

___ **76-311 THE COMPLETE BOOK OF TIE-DYING** **$1.95**
by Astrith Deyrup

___ **76-313 RUGMAKING FROM START TO FINISH** **$1.95**
by Joan Scobey

___ **76-315 GARDENING INDOORS UNDER LIGHTS** **$1.95**
by Frederick H. and Jacqueline L. Kranz

___ **76-318 CANDLES: A STEP-BY-STEP GUIDE TO CREATIVE CANDLEMAKING** **$1.95**
by Arden J. Newsome

___ **76-324 DECOUPAGE OLD AND NEW** **$1.95**
by Elyse Sommer

If these books are not available at your local bookseller, check off the titles you want and mail the coupon below along with the price indicated plus 10¢ per copy to cover mailing costs. On orders of four or more books, Lancer will pay the postage. WE CANNOT BE RESPONSIBLE FOR CASH. Write for our free mail-order catalog. Send orders to: Lancer Books, Inc., 1560 Broadway, New York, N.Y. 10036.

Name _____

Address _____

City _____ State _____ Zip _____

MORE CRAFT IDEAS FROM LANCER LARCHMONT BOOKS

Fully illustrated with photos and diagrams

____ **76-309 NEEDLEPOINT FROM START TO FINISH** **$1.95**
by Joan Scobey

____ **76-312 CONTEMPORARY CROCHET** **$1.95**
by Susan Morrow and Mark Dittrick

____ **76-317 NEW PRACTICAL HOME REPAIR FOR WOMEN** **$1.95**
by Bruce Cassiday

____ **76-320 TOYS: A STEP-BY-STEP GUIDE TO CREATIVE TOYMAKING** **$1.95**
by Charlene Davis Roth with Jerome Roth

____ **76-325 RESTORING JUNK** **$1.95**
by Suzanne Beedell

____ **76-326 MAKING SILVER JEWELRY** **$1.95**
by Nona Ziek

____ **76-327 GROWING MIDGET VEGETABLES AT HOME** **$1.95**
by Grant and Holly Gilmore

If these books are not available at your local bookseller, check off the titles you want and mail the coupon below along with the price indicated plus 10¢ per copy to cover mailing costs. On orders of four or more books, Lancer will pay the postage. WE CANNOT BE RESPONSIBLE FOR CASH. Write for our free mail-order catalog. Send orders to: Lancer Books, Inc., 1560 Broadway, New York, N.Y. 10036.

Name _____

Address _____

City _____ State _____ Zip _____

Create The World In Miniature —
A How-To Guide For Planning
and Planting Your Terrarium!

BOTTLE GARDENS

- guides you step-by-step from watering to replanting.
- tells you what to grow and what not to grow.
- gives you design tips for square, rectangular and round bottles.
- shows you how to choose appropriate plants for specific landscapes.

JACK KRAMER

is the author of over thirty gardening books, including the bestseller, HANGING GARDENS. His articles have appeared in *House & Garden, House Beautiful, Woman's Day* and other national magazines. Mr. Kramer has made guest appearances on The Today Show and The Dinah Shore Show where he has demonstrated his expertise.

A LANCER LARCHMONT BOOK—NEVER BEFORE PUBLISHED
Cover printed in the U.S.A.